October 2001

Regional Indicators: European Union (EU)

The European Union, with increasingly integrated economies and energy sectors, is the world's second-largest energy consumer (behind the United States). EU members include: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

Note: Information contained in this report is the best available as of October 2001 and is subject to change.

BACKGROUND

The European Union (EU) was founded as the European Economic Community (EEC) by the Treaty of Rome in 1957 to promote economic and political integration in Europe. The founding of the EEC followed the creation of the European Coal and Steel Community, established after World War II as a means of promoting integration among former enemies. The EEC has expanded from its original six members (Belgium, France, the Federal Republic of Germany, Italy, Luxembourg, and the Netherlands) to include the United Kingdom, Ireland, and Denmark in 1973; Greece in 1981; Spain and Portugal in 1986; and Austria, Finland, and Sweden (former members of the European Free Trade Association) in 1995. The Treaty on European Union (known as the Maastricht Treaty) ushered in a new stage in European history when it entered into force on November 1, 1993. Maastricht renamed the community (now known as the EU), created European citizenship, strengthened the power of the European Parliament, laid out plans for Economic and Monetary Union (EMU), and committed members to negotiate for expansion of the EU to include Central and Eastern European countries. In 2000, EU members were estimated to account for 29% of world economic activity (see Table 1), a share that remained about constant during the 1990s. The United States has extensive trade relations with the EU. In 2000, 22% of U.S. exports ($152 billion) went to EU members, and 19% of U.S. imports ($195 billion) originated in EU countries.

As part of EMU, 11 EU member countries (Belgium, France, Germany, Italy, Spain, Portugal, Finland, Austria, the Netherlands, Ireland and Luxembourg) adopted a new common European currency, called the "euro," on January 1, 1999. The European Central Bank (ECB) is housed in Frankfurt, Germany. This means that a single monetary policy for the 12 particpating countries is elaborated at the ECB. Euro banknotes and coins are scheduled to begin circulating in all participating countries no later than January 1, 2002, and the euro is to replace completely all participating countries' national currencies by July 1, 2002. Most countries' banks have already been frontloaded with coins and banknotes, starting in September 2001.

Greece was the only EU member country that applied but was denied entry to EMU at its introduction; in June 2000, Greece's application was accepted and Greece became a member of the euro-zone on January 1, 2001. The

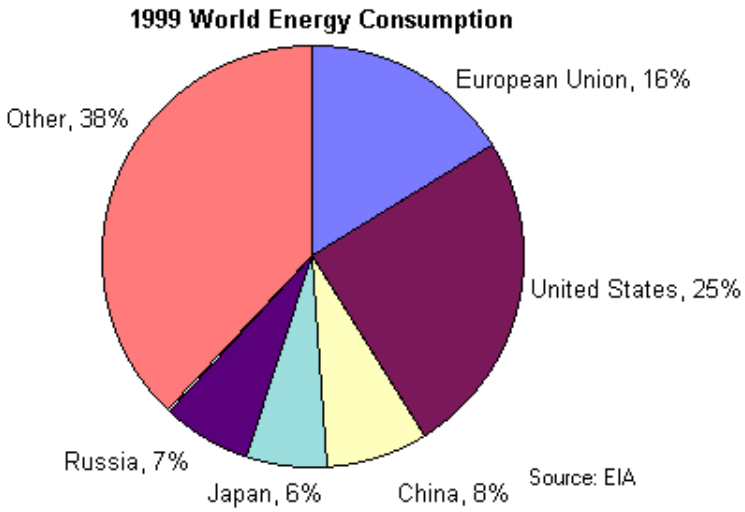
United Kingdom and Denmark opted out and Sweden purposely did not meet requirements. The euro-zone represents about 80% of the EU's GDP. The euro currently functions as a base currency for the currencies of all the countries participating in the euro; they are all fixed to the euro, and although the euro is not used as banknotes or coinage, the euro is the only currency that fluctuates in value with other currencies, including the U.S. dollar. The euro fell in value intially against the dollar, from being worth $1.18 in January 1999, to about $1.00 by the end of 1999, and $0.85 in October 2000, before rising again to $0.93 in January 2001. Since then, the euro has stabilized at between $0.93 and $0.85, being valued most recently at $0.91.

In 2001, the Treaty of Nice was signed by member governments. This treaty changes the way the institutions of the EU operate in order to make possible the admission of new member states in the future. Central and Eastern European EU applicants expected to join in the next phase of EU expansion include Poland, Hungary, the Czech Republic, Estonia, Slovenia and Cyprus. Some EU members are calling for a target date by which these applicants will be admitted officially. No date has been set, but membership is expected to extend to these six countries by about 2005. Slovakia, Bulgaria, Romania, Latvia, Lithuania, Turkey and Malta also have begun discussions of accession.

EU legislation has played a significant role in member countries' domestic energy policies. The EU Directive on Electricity was passed in January 1997 and required members to begin opening up their electricity markets to competition within two years (Greece, Belgium and Ireland were granted waivers). The EU Natural Gas Directive was passed in June 1998 (Greece, Belgium,and Ireland again were granted waivers), requiring the opening of EU members' gas markets. The Gas Directive has also affected Norway, as it is a member of the European Economic Area (EEA).

ENERGY CONSUMPTION

In 1999, EU countries consumed 62.7 quadrillion British thermal units (Btu) of energy (16% of the world's total) and generated 915 million metric tons of energy-related carbon emissions (15% of the world's total). Oil is the dominant fuel (see Table 2), accounting for 44% of 1999 total energy consumption in the region, followed by natural gas at 22%. In 1999, EU members consumed about 34% of the world's nuclear power, 18% of the world's oil, 16% of the world's natural gas, and over 10% of the world's coal. Over the past decade, natural gas has been the fastest growing fuel source in the EU, mainly at the expense of coal, whose share has declined sharply. This is in part due to environmental considerations, but also due to increased availability of natural gas supplies because of pipelines from Algeria, Norway, and Russia. Nuclear power generation has grown only slightly over the past decade. Nuclear power is gradually being phased out in Germany over the next twenty years, so its share of EU energy consumption is likely to drop. Hydroelectric power generation has remained about constant over the past decade. Other "renewables" (geothermal, biomass, solar, wind) doubled between 1992 and 1999, from a relatively small base level. Renewable energy and natural gas are expected to be the two fastest growing fuels in the EU over the next 20 years.



The combined economies of the EU are similar in size to the U.S. economy ($8.5 trillion gross domestic product for the EU in 2000 and $10 trillion for the United States), and the EU population of 379 million exceeds the U.S. population of 278 million. However, EU total energy consumption for 1999 of 63 quads is less than the U.S.

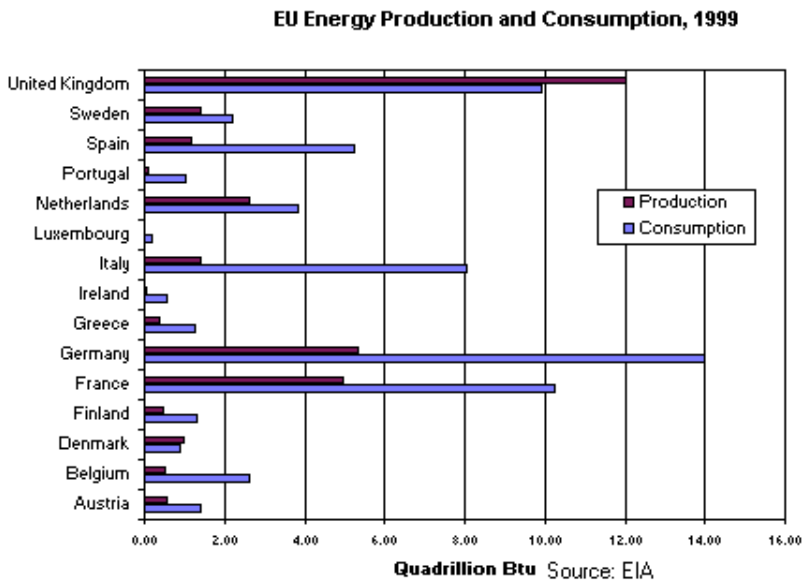
consumption of 97 quads.

ENERGY RESOURCES AND SUPPLY

EU members possess only about 0.7% of the world's proven reserves of oil and 2.2% of the world's natural gas reserves (see Table 3). However, they have 7.4% of proven coal reserves, 16% of the world's capacity for refining crude oil into petroleum products, and 16% of the world's electric generating capacity. In 1999, they produced 5% of the world's crude oil, 9% of the world's natural gas, and 8% of the world's coal.

IMPORT DEPENDENCY

The EU region is a net importer of energy. In 1999, while the EU's 15 members consumed 16% of the world's energy, they produced only 8%. Import dependency varies by fuel and individual country, with an overall import dependency for the entire EU of around 50%. In 1999, the EU was a net importer of coal (8% of world production in terms of tonnage vs. 11% of consumption in terms of tonnage); natural gas (9% of world production vs. 16% of consumption); and oil (5% of world production vs. 18% of consumption). Germany, Italy, and France are the EU's largest net importers of energy; the United Kingdom is the only significant net exporter. EU oil is imported primarily from Russia, the Persian Gulf region, Norway, and North Africa.



ENERGY USE AND CARBON EMISSIONS

The 15 EU countries collectively emitted 915 million metric tons (Mmt) of carbon from the consumption of fossil fuels in 1999. This accounted for 15% of world carbon emissions in that year. Of the EU countries, Germany emitted the most carbon (230 Mmt), followed by the United Kingdom (152 Mmt), Italy (121 Mmt) and France (109 Mmt). Overall, the EU emitted 2.4 metric tons of carbon per person in 1999, compared to a U.S. average of 5.6 metric tons per person. Under the December 1997 Kyoto Protocol, the EU is obligated to reduce its greenhouse gas emissions 8% from 1990 levels (in that year, the EU emitted 913 Mmt of carbon) by 2008-2012. All EU member states signed the Kyoto Protocol on April 29, 1998. On June 17, 1998, the EU agreed on how it would meet the 8% reduction. Under this agreement, different EU member states are assigned varying degrees of emission cuts, ranging from a 4% increase in the case of Sweden, to a reduction of 28% in the case of Luxembourg, with other countries somewhere in between.

Table 1. Economic and Demographic Indicators for EU Countries

	Gross Domestic Product (GDP) (purchasing power parity)				
	2000E (Billions of U.S. Dollars)	Real GDP Growth Rate		Per Capita, 2000E(U.S. Dollars)	Population, 2001E (Millions)
		2000 Estimate	2001 Projection		

Austria	$203	3.1%	2.6%	$25,000	8.2
Belgium	$259.2	4.1%	2.5%	$25,300	10.3
Denmark	$136.2	2.8%	2.2%	$25,500	5.4
Finland	$118.3	5.6%	4%	$22,900	5.2
France	$1,448	3.1%	2.7%	$24,400	59.6
Germany	$1,936	3%	2.4%	$23,400	83
Greece	$181.9	3.8%	3.9%	$17,200	10.6
Ireland	$81.9	9.9%	8.4%	$21,600	3.8
Italy	$1,273	2.7%	2.5%	$22,100	57.7
Luxembourg	15.9	5.7%	5.5%	$36,400	0.4
Netherlands	$388.4	4%	3.2%	$24,400	16
Portugal	$159	2.7%	2.8%	$15,800	10
Spain	$720.8	4%	4.4%	$18,000	40
Sweden	$197	4.3%	2.8%	$22,200	8.9
United Kingdom	$1,360	3%	2.4%	$22,800	59.6
Total	**$8,478.6**	**3.3%**	**2.8%**	**$22,446**	**378.7**

Source: CIA, WEFA World Economic Outlook.

Table 2. Energy Consumption and Carbon Emissions in EU Countries, 1999

	Energy Consumption								Carbon Emissions (Million metric tons)
	Total (Quadrillion Btu)	Petroleum	Natural Gas	Coal	Nuclear	Hydroelectric	Other Renewable Electricity	Net Electricity Imports	
Austria	1.39	39%	22%	9%	0%	30%	1%	-1%	18

Belgium	2.61	46%	23%	12%	18%	0.1%	0.4%	0.3%	38
Denmark	0.89	53%	23%	22%	0%	0.03%	5%	-3%	17
Finland	1.31	34%	11%	11%	17%	10%	8%	9%	13
France	10.26	41%	14%	6%	38%	7%	0.2%	-6%	109
Germany	13.98	41%	21%	23%	12%	1%	1%	0.1%	230
Greece	1.28	63%	4%	29%	0%	4%	0.3%	0.1%	26
Ireland	0.56	62%	23%	12%	0%	2%	0.5%	0.4%	10
Italy	8.04	51%	30%	6%	0%	6%	1%	5%	121
Luxembourg	0.19	49%	15%	2%	0%	2%	0.4%	31%	2
Netherlands	3.85	45%	40%	8%	1%	0.03%	1%	5%	64
Portugal	1.02	68%	8%	15%	0%	7%	1%	-1%	17
Spain	5.23	57%	11%	14%	11%	5%	1%	1%	82
Sweden	2.20	34%	1%	4%	30%	33%	1%	-4%	16
United Kingdom	9.92	35%	35%	16%	11%	1%	1%	%	152
Total	**62.73**	**44%**	**22%**	**13%**	**14%**	**5%**	**1%**	**0.4%**	**915**

Source: Energy Information Administration *Note: Percentages may not add to 100% due to independent rounding.*

Table 3. Energy Supply Indicators--EU Countries

	Fossil Fuel Proved Reserves			**Fossil Fuel Production, 1999**				
	Crude Oil, 1/1/01(Million barrels)	**Natural Gas, 1/1/01 (Trillion cubic feet)**	**Coal (Billion short tons)**	**Oil (Crude, liquids, and processing gain; Thousand barrels/day)**	**Natural Gas (Trillion cubic feet)**	**Coal (Million short tons)**	**Electric Generating Capacity, 1/1/99 (Million kilowatts)**	**Crude Oil Refining Capacity, 1/1/01 Thousand barrels/day)**

Austria	86	0.9	0.0	21	0.1	1.3	14	209
Belgium	0	0.0	0.0	12	0.0	0.4	13	768
Denmark	1,069	3.4	0.0	304	0.3	0.0	13	176
Finland	0	0.0	0.0	0	0.0	0.0	16	200
France	145	0.5	0.1	80	0.1	6.3	108	1,895
Germany	380	11.5	73.9	132	0.8	226.1	108	2,259
Greece	10	0.0	3.2	4	0.0	67.2	9	407
Ireland	0	0.7	0.0	1	0.0	0.0	4	71
Italy	622	8.1	0.0	147	0.6	0.0	66	2,359
Luxembourg	0	0.0	0.0	0	0.0	0.0	0	0
Netherlands	107	62.5	0.5	114	2.6	0.0	14	1,204
Portugal	0	0.0	0.0	2	0.0	0.0	10	304
Spain	21	0.0	0.7	20	0.0	26.7	45	1,294
Sweden	0	0.0	0.0	0	0.0	0.0	33	423
U.K.	5,003	26.8	1.7	2,967	3.5	40.9	70	1,771
Total	**7,443**	**114.4**	**80.1**	**3,804**	**8.0**	**368.9**	**523**	**13,340**

Sources: Energy Information Administration, *Oil & Gas Journal*.

Sources for this report include: Energy Information Administration, International Energy Agency; European Union; Oil and Gas Journal.

LINKS

Links to other U.S. government sites:
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France

France is one of the world's largest nuclear power producers, but has very limited fossil fuel resources. The 1999 merger of its top two oil companies formed the fourth largest oil company in the world.

The information in this report is the best available as of January 2002 and is subject to change.

BACKGROUND

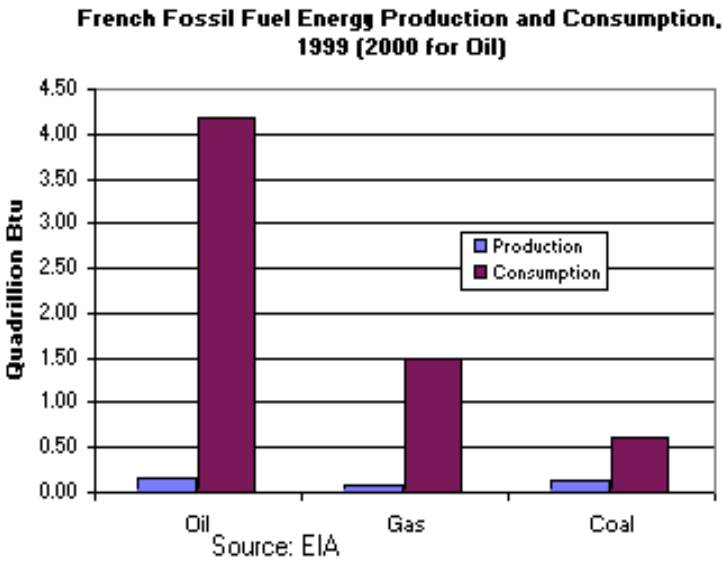
One of the world's largest economies, France is a founding member of the European Union (EU) and a member of the Group of Seven (G-7) industrialized nations, the General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO), the International Energy Agency (IEA), and the International Atomic Energy Agency (IAEA). France joined the common European currency, the euro, on January 1, 1999. France's economy has had stronger growth than that of many of its neighbors in recent years, having experienced a cyclical upturn since late 1997 that is now winding down. France's economy grew 3.4% in 2000, but growth is estimated to have declined to 2.1% in 2001. France's economy in 2002 will closely track the eurozone as whole, where growth for 2002 is forecast at 1.4%. Euro coins and bills were introduced beginning January 1, 2002, though the French franc has been pegged to the euro since 1999.

Traditionally, the role of the state has been stronger in France than in other Western European countries. France is one of the most centralized countries in Europe with a strong history of state ownership in the aviation, telecommunications, and energy industries. However, the role of the government now is changing. Important economic and political changes in France include widespread privatization and increasingly frequent mergers and acquisitions (M&As) and hostile corporate takeovers, once virtually unheard of in France.

International pressures of globalization and more direct pressure from the EU are behind the current trend away from government involvement in industry. The French government is headed by the moderate socialist prime minister, Lionel Jospin, and the Gaullist president, Jacques Chirac, under the French system of governmental "cohabitation." The divided government has moved very slowly toward privatization of the country's energy industry, despite an EU directive that calls for member states to relinquish control of their energy companies to the private sector. This has caused friction between France and other EU members, particularly in regard to acquisitions by Electricite de France (EdF).

ENERGY

French energy policy has been relatively consistent in recent decades, with the main objectives including: securing energy supply, achieving international competitiveness, and protecting the environment. The focus on energy security has led France to become one of the world's top producers and consumers of nuclear power. France's production of primary energy rose by 2.1% in 2000, to about 5.04 quadrillion Btu. France's energy demand rose by 1.1% to about 10.3 quadrillion Btu. However, France's total energy bill rose by 102% in 2000, to 155.2 billion French francs (FFR).



OIL

About 1.9 million barrels per day (bbl/d) of France's approximate 2 million bbl/d oil consumption are imported. France has reserves totaling only 140 million barrels. Exploration increased in 2000-2001 because of higher oil prices, and France's proven reserves increased in 2000, though they are still extremely small, and fell slightly in 2001. France's domestic crude oil production comes from numerous wells producing very small amounts of oil. Because of France's limited domestic fossil fuel energy sources, security of supply historically has been a major concern.

Despite France's limited domestic reserves and production, the French oil industry is an important actor in world energy markets. Major oil assets of French oil companies are located in the North Sea, Africa, and Latin America. French imports come primarily from Saudi Arabia and Norway, followed by the United Kingdom (UK), Iraq, Iran, Nigeria, and Russia. In July 2001, the Iraqi government stated that it would reconsider oil projects with French companies and no longer give French companies "priority" due to France's support of the U.S.-British "Smart Sanctions" proposal at the United Nations Security Council. Iraq has letters of intent with TotalFinaElf that would take effect when sanctions are lifted.

In early 1999, French oil company Total merged with Belgian oil company Petrofina to create TotalFina, the world's sixth-largest oil company and the third-largest oil company in Europe. Only months later, TotalFinaElf was formed by TotalFina's acquisition of Elf Aquitaine. After the deal was completed in 2000, TotalFinaElf became the fourth-largest publicly listed oil company in the world, after ExxonMobil, Royal Dutch/Shell, and BP. TotalFinaElf has proven reserves of about 10.8 billion barrels of oil equivalent and production of about 2.1 million bbl/d. TotalFinaElf has very little crude oil production in North America or Asia (outside of the Middle East), unlike the other super majors. The company claims to have raised hydrocarbon output by 6% in 2001 and plans to raise production by 9% in 2002 as major new resources come on stream. TotalFinaElf owns more than 50% of the refinery capacity in France, and is the seventh-largest refiner in the world.

Downstream

France's crude oil refining capacity is 1.9 million bbl/d. The country's largest refinery is TotalFinaElf's refinery at Gonfreville l'Orcher with a capacity of 323,643 bbl/d. Increasingly strict EU environmental

regulations for refineries are in large measure behind recent upgrades in the French refining sector. The regulations will become considerably more strict in 2005, and substantial investment in the refining sector will be necessary to meet these new mandatory targets. ExxonMobil has begun adapting its Port Jerome refinery to 2005 EU specifications.

Because oil security has been such a concern for French energy policy-makers, there is a French law allowing the French government to refuse to close a refinery if it believes its supply or price security is at risk. Essentially, this gives the French government veto power over EU legislation regarding refineries. This could become an important issue as the EU's environmental standards are strengthened further.

NATURAL GAS

France has very limited natural gas resources and therefore imports almost all of the natural gas it consumes. Natural gas consumption increased 3.6% in 2000, and the share of natural gas in the French energy market rose to 14.5%. Industry's share of consumption rose from 44% to 48% year-on-year 1999-2000, but household use declined from a 39% share to a 36% share year-on-year 1999-2000.

The French natural gas industry is run by Gaz de France (GdF), the state-held company with a monopoly on importation and distribution of natural gas in France. By 2003, Gaz de France aims to possess sufficient reserves to produce at least 15% of the natural gas it sells. The company's annual production capacity stands at more than 70 billion cubic feet (Bcf). GdF also has the largest underground storage capacity in western Europe, with 318 Bcf, about 3 months supply. In November 2001, the French government decided to privatize the country's natural gas transport network, allowing the operators, GdF and a subsidiary of TotalFinaElf, to purchase it. However, Communist members of parliament blocked the plan in December, though it seems likely that a version will take effect sometime in 2002. France is the only EU country that owns a franchised natural gas network. GdF has increased substantially its holdings in North Sea natural gas over the past few years, including interests in Norway's Snoehvit and Njord fields. The company acquired holdings in twelve exploration licences in the UK North Sea with an average equity of 21% from Texaco in June 2001. GdF supplies about a fifth of total French consumption from its holdings in France and abroad. Norway is France's top natural gas imports supplier, followed by Russia and Algeria. Natural gas imports from Russia have been declining in recent years, while imports from Algeria have been rising. However, there has been discussion of a new pipeline to connect Russian natural gas to France. The Netherlands is a smaller source of French natural gas imports. GdF also imports liquefied natural gas (LNG) to its two terminals. In addition to long-term contracts, GdF buys natural gas on the spot market or with short-term contracts from the UK's North Sea.

France is the only country in the EU that has not yet enacted any legislation adopting the rules of the EU's 1998 Gas Directive. However, there have been some changes in France's natural gas market since 1998. The EU directive required that 20% of member countries' natural gas markets become competitive. Without a legal basis, GdF nonetheless opened its grid to third-party access in August 2000. About 100 of the country's largest industrial consumers now are able to choose their suppliers. The companies allowed to choose other suppliers and use GdF's network are limited to 20% of the market, the minimum prescribed in the directive. However, no progress has yet been made on plans to change the status of GdF from a wholly-owned state enterprise to a joint stock company, that could then be partially privatized. Because France has been one of the slower countries to pave the way for competition, it has come under harsh criticism from the EU and fellow member countries. In September 2000, the European Commission (EC, the executive body of the EU) sent a formal warning letter to France for failure to notify the EC of national laws enacted to ensure implementation of the 1998 Natural Gas Directive. Although France adopted draft legislation in May 2000, the full national parliament has not yet passed a law to open the market, and is not likely to do so until after the parliamentary and presidential elections in the spring of 2002.

GdF is establishing France as a hub for Western European natural gas. In October 1998, France for the first time became linked via pipeline to a foreign production field. The NorFra pipeline linked Norway's Troll gas field in the North Sea to the French natural gas grid. The pipeline is 840 kilometers (521 miles) long, and is the longest undersea natural gas pipeline in the world. About half of the natural gas from the pipeline will transit through France to points in Italy and Spain, while the other half will be consumed in France. By

2005, the Norwegian pipeline is expected to supply one-third of France's total natural gas consumption. GdF is increasing its trading activities in partnership with Societe Generale, a French Bank. GdF's trading affiliate, Gaselys, carried out 600 transactions in 2000, six times the volume of 1999. GdF has invested abroad heavily, and owns distribution networks in several countries. However, France's lack of liberalization may cause problems with GdF's business in other EU countries. In 2001, Spain's Enagas refused access to its pipelines to GdF on the grounds that there is a "lack of reciprocity with France." In addition, this has prevented GdF from entering partnerships that have cross-ownership with foreign companies, such as Statoil.

GdF is constructing the Les Marches du Nord-Est pipeline in two parts. The first 124-mile part went operational in October 2001, and the second 186-mile part is expected to go operational in October 2002. GdF has signed a 25-year contract with Italy's Snam for delivery of 6 billion cubic meters (Bcm, or 212 Bcf) of Norwegian natural gas through the pipeline. GdF plans to spend $2.5 billion 2001-2003 on developing its pipeline network and installations in France.

Liquefied Natural Gas

GdF has two liquefied natural gas (LNG) terminals: the 159-Bcf-per-year capacity facility at Fos-sur-Mer near Marseille and the 353-Bcf-per-year capacity facility at Montoir-de-Bretagne, near Nantes. Increasing France's importance as a transit center, GdF receives Nigerian LNG at its Montoir-de-Bretagne terminal that is swapped out to Italy's Enel. The terminal receives 4 Bcm (141 Bcf) annually, 3.5 Bcm (124 Bcf) under the Italian contract and 0.5 Bcm (18 Bcf) under a contract signed by GdF.

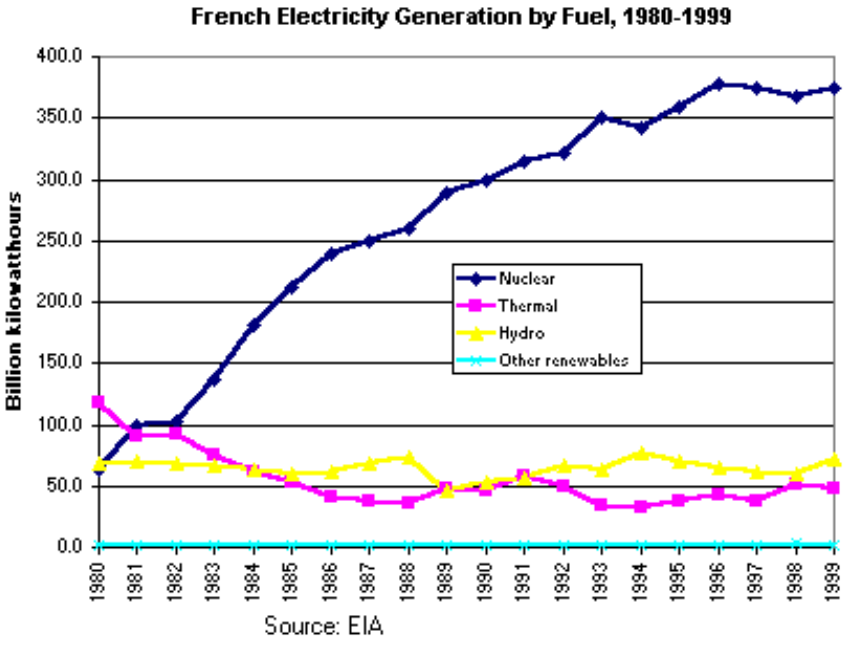
COAL

France has very limited coal reserves and neither produces nor consumes significant amounts of coal. Coal-fired electricity has been mostly replaced by nuclear power. Coal imports come from Australia, the United States, and South Africa.

The French government has supported the coal industry since the 1994 National Coal Pact between Charbonnages de France (CdF), the state coal company, and French coal miners unions. According to the agreement, the industry would receive state support as it gradually phased out the industry all together. All French coal mines are slated to be shut down by 2005. In May 2001, the EC authorized France to pay EUR 991 million in state aid to the coal industry. The number of mine workers is to have been reduced to 2,800 at the end of 2001 and production to just 2.2 million short tons, according to the government's plan.

ELECTRICITY

France is the second-largest electricity market in Europe (behind Germany). France's electricity sector is dominated by the state-held monopolist, Electricite de France (EdF), which produces, transports, and distributes over 95% of electricity in France. EdF is the last major state-run electricity monopolist in the EU, as most of France's neighbors have privatized their electricity companies. However, there has been partial liberalization of some aspects of France's electricity sector.



A 1996 EU directive required that at least 26% of electricity sales in member counties be opened to competition, beginning in February 1999. This requirement increased to 28% in February 2000 and will

increase further to 33% in 2003. In February 2000, a full year after the first EU deadline, France passed legislation that began the electricity sector's liberalization. Since that time, about 1,800 large industrial and commercial consumers (those using more than 16 million kilowatthours per year) comprising about 30% of the market have been able to choose their electricity supplier (although few of these consumers actually have changed suppliers). There has been criticism that the February 2000 law's requirement of three-year contracts is an obstacle to the real establishment of a free market.

Another step toward liberalization has been the creation of the Electricity Transmission Network (Reseau de Transport d'Electricite, RTE) that owns the country's high tension transmission network. RTE's mission is to assure all clients fair access to the network. The single tariff for international electricity transport proposed by RTE was given a positive reception by the European council of energy ministers in May 2001. In addition, an energy regulatory body has been established to oversee the deregulation process. The Commission for the Regulation of Electricity (CRE), which also will oversee natural gas deregulation when the time comes, has four main purposes: (1) advising the government in nearly all matters relating to electricity, (2) the close monitoring of the rules governing the access to the networks and compliance therewith, (3) the auditing of EdF's unbundled accounts, and (4) sanctions against infringements in certain cases, mainly in relation to network access. CRE is gradually taking on more responsibility as liberalization continues.

In late November 2001, the Powernext electricity trading market was launched in France. Powernext auctions standard hourly contracts for physical delivery of electricity to business customers under responsibility of the RTE and guaranteed by Clearnet, a subsidiary of the Euronext stock exchange. Powernext aims to trade 10% of the French market by 2003-2004, and also to act as a price reference for the electricity market. In an additional liberalizing step, in accordance with the terms of EdF's acquisition of a controlling stake in Germany's EnBW, EdF sold 1200 megawatts (MW) of virtual power capacity to some 20 competitors (generators, traders, etc.), French and foreign, in 2001.

There are currently only two companies of any size in France that may be able to compete on a limited basis with EdF in the future. France's second-largest electricity group is Compagnie Nationale de Rhone (CNR), which produces about 3% of France's electricity, mostly from hydroelectric plants. In August 2001, a company for the commercialization of CNR's production was created by CNR and Electrabel of Belgium that is called Energie du Rhone. It will also market electricity produced by Electrabel. The French government has made EdF divest itself from its small holding in CNR in an effort to liberalize the market. The other producer is SNET, a subsidiary of French coal utility Charbonnages de France. In an effort to get into the French market, ENDESA of Spain has purchased about 30% of SNET. Because of interconnectors, other foreign companies are also attempting to get a foothold in the French electricity market. So far, EnBW (34.5% owned by EdF) and RWE, both of Germany, have attracted a small amount of industrial customers.

EdF has come under criticism and scrutiny from member EU countries, the European Comission (EC), and others on several counts. One is that liberalization around the world, and in the EU in particular, has made many electricity assets available abroad while EdF's assets (which are about 95% of the market) are unavailable. Hence, EdF can purchase foreign companies, but foreign companies cannot purchase assets in France. Another charge is that EdF's status as a state-owned monopoly has made it easier for it to purchase and outbid competitors abroad. EdF allegedly enjoys a lower cost of capital than private-sector rivals and a management that can focus on expansion rather than domestic competitors. In addition, it is alleged that taxpayers finance the expansion while the company does not have to justify its expansion to shareholders as would be necessary in a private sector company. In June 2001, the EC launched an investigation into EdF to see whether the company has benefitted from illegal state aid such as tax breaks or certain financial guarantees.

In any event, EdF has made many large foreign purchases in the past few years, such that 25% of EdF's 2000 revenues of EUR 34.4 billion came from assets in 19 foreign countries. The contract between the French government and EdF for 2001-2003 plans for EUR 19 billion in purchases abroad by 2005. In response, Spain and Italy passed laws or adopted regulations that make it difficult for EdF to purchase their

electricity assets. Spain compromised October by allowing the takeover of part of Hidrocantabrico in return for France increasing the interconnection between the two countries from 1,000 MW to 4,000 MW by 2006. In terms of Italy's law, the EC ruled in June 2001, that capital flows may not be restricted merely because of varying degrees of liberalization. However, the initial privatization sale may be restricted, but such restrictions can only be in place for a limited period, after which the privatized companies can be resold to state-owned companies.

In December 2001, Laurent Fabius, Minister for Finance and the Economy, stated his opposition to a proposed 5% increase in electricity rates by EdF in 2002. EdF raised rates 1% in November 2001.

Nuclear

France is the world's largest nuclear power generator on a per capita basis, and ranks second in total installed nuclear capacity (behind the United States). Because of France's extremely limited domestic energy sources, energy supply security and reliance on imports are major issues in France. Government policy has promoted a dramatic increase in nuclear power generation over the past three decades. Currently, about 75% of French electricity comes from France's 57 nuclear power plants. This represents a dramatic change from 1973, when fossil fuels accounted for more than 80% of French power generation. The government nuclear regulator is DSIN, and EdF operates the plants. In July 2001, France and the United States signed an accord to jointly fund U.S.-French research on advanced reactors and fuel cycle development.

France is now seen to be retreating slowly from its staunchly pro-nuclear position. Previously, the government planned to have nuclear power reach 100% of electricity generation. Environmental objections have increased in recent years. Germany's decision to phase out nuclear power started a public debate within France about the future of its own industry, and public opinion polls showed that a growing percentage of the public favors an end to nuclear power.

France now must decide whether to replace obsolete nuclear plants with more modern nuclear plants, or to begin phasing out nuclear power. Since 1997, the ruling government of Prime Minister Jospin has included members of the Green Party, *Les Verts*. The government has generally come to the conclusion that the volume of nuclear capacity exceeds its economically efficient contribution to the electricity market. Nevertheless, costs will fall when plants continue functioning past their 30-year capital amortisation periods, though how much longer they can function past thirty years is an open question.

In July 2001, the reorganization of the French nuclear sector commenced with the nomination of a management committee for a new holding company, Topco, that will preside over the country's major nuclear enterprises. Its nuclear operations will include mining, fuels, treatment, recycling, decontamination and engineering. As part of a restructuring program announced in Nov 2000, CEA-Industrie, Cogema and Framatome announced plans to merge Framatome with a company holding Cogema's stakes in Framatome, Eramet, TotalFinaElf and Cogerap. CEA-Industrie is the holding company for the state's Commissariat a l'Energie Atomique. The capital of the new company - Topco - eventually would be open to industrial partners and the amount of stock available on the market would be increased over time. The EC required this new structure in order to approve the merger of Framatome's nuclear business with that of Siemens of Germany that was approved in February 2001. EdF divested itself of Framatome, and EdF will now be able to have competitive bidding for nuclear services and supplies that formerly had been exclusively sourced from Framatome.

France is one the few countries in the world with a nuclear reprocessing plant. Cogema's La Hague facility received authorization from DSIN to start operations of two new facilities, hull and end-pieces compacting and plutonium purification and conditioning, in January 2002.

ENVIRONMENT

In terms of environmental issues, France is noted for using nuclear energy that results in less greenhouse gases, but this creates other environmental concerns. The country's lack of fossil fuel resources, in addition

to making France keenly aware of the importance of energy security, paradoxically has made France rely on cleaner energy sources. However, air pollution, especially in Paris, remains a pertinent environmental issue to urban dwellers.

In general, however, most energy-related environmental trends in France appear to be headed for greater efficiency and less environmental impact. The country's rate of energy consumption is holding steady, and France's energy and carbon intensity are on the decline. In addition, France has announced an extensive 10-year plan to curb its carbon emissions in order to meet its commitments under the Kyoto Protocol--one of the first countries to do so.

As part of this plan, France has reiterated its need to develop renewable energy sources to maintain its energy self-sufficiency. Although nuclear energy has helped to provide France with the energy independence the country desires, objections to nuclear energy are increasing. In the 21st century energy efficiency measures in all sectors of the economy likely will be needed in order to make further environmental improvement a realistic proposition.

Sources for this report include: CIA World Factbook; Dow Jones News Wire service; Economist; Economist Intelligence Unit ViewsWire; Financial Times; Petroleum Economist; Petroleum Intelligence Weekly; U.S. Energy Information Administration; WEFA World Economic Outlook.

COUNTRY OVERVIEW

President: Jacques Chirac (since May 1995)
Prime Minister: Lionel Jospin (since June 1997)
Independence: 486 (unified by Clovis)
Population (July 2001E): 59.6 million
Location/Size: Western Europe, bordering the Bay of Biscay and English Channel, between Belgium and Spain southeast of the UK; bordering the Mediterranean Sea, between Italy and Spain/547,030 sq km (slightly less than twice the size of Colorado)
Language: French 100%, rapidly declining regional dialects and languages (Provencal, Breton, Alsatian, Corsican, Catalan, Basque, Flemish)
Ethnic groups: Celtic and Latin with Teutonic, Slavic, North African, Indochinese, Basque minorities
Religions: Roman Catholic 90%, Protestant 2%, Jewish 1%, Muslim (North African workers) 3%, unaffiliated 4%
Defense (8/98): Army 203,200; Air Force 78,100; Navy 63,300

ECONOMIC OVERVIEW

Economy, Finance, and Industry Minister: Laurent Fabius
Currency: Euro (EUR)
Exchange Rate (1/10/02): 1 U.S. Dollar = EUR 1.12
Gross Domestic Product (GDP, 2001E): $1.21 trillion
Real GDP Growth Rate (2001E): 2.1% **(2002F):** 1.1%
Inflation Rate (consumer prices, 2001E): 1.7% **(2002F):** 1.3%
Unemployment Rate (2001E): 8.9% **(2002F):** 9.8%
Exports of Goods and Services (2001E): $294.3 billion
Imports of Goods and Services (2001E): $295.3 billion
Major Trading Partners: Germany, Italy, Belgium, the United Kingdom, the United States
Major Export Products: Machinery and transport equipment, agricultural products, chemical products
Major Import Products: Machinery and transport equipment, agricultural products, chemical products, and energy

ENERGY OVERVIEW

Proven Oil Reserves (1/1/02E): 140 million barrels
Oil Production (2001E): 78,000 barrels per day (bbl/d), of which 28,000 bbl/d is crude oil
Oil Consumption (2001E): 2 million bbl/d

Net Oil Imports (2001E): 1.9 million bbl/d
Crude Oil Refining Capacity (1/1/02E): 1.9 million bbl/d
Natural Gas Reserves (1/1/02E): 403 billion cubic feet (Bcf)
Natural Gas Production (1999E): 0.07 trillion cubic feet (Tcf)
Natural Gas Consumption (1999E): 1.35 Tcf
Net Natural Gas Imports (1999E): 1.28 Tcf
Coal Reserves (12/31/96E): 128 million short tons (Mmst)
Coal Production (1999E): 6 Mmst
Coal Consumption (1999E): 26 Mmst
Electric Generation Capacity (1/1/99E): 108 gigawatts
Electricity Generation (1999E): 497 billion kilowatthours (bkwh), 75% nuclear, 14% hydro, 10% thermal, less than 1% other renewables
Electricity Consumption (1999E): 399 bkwh
Net Electricity Exports (1999E): 98 bkwh

ENVIRONMENTAL OVERVIEW

Minister of Regional Development and Environment: Yves Cochet
Total Energy Consumption (1999E): 10.3 quadrillion Btu* (2.7% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 108.6 million metric tons of carbon (1.7% of world carbon emissions)
Per Capita Energy Consumption (1999E): 173.5 million Btu (vs. U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 1.8 metric tons of carbon (vs. U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 7,324 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.08 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (40.0%), Residential (23.8%), Transportation (20.7%), Commercial (15.5%)
Sectoral Share of Carbon Emissions (1998E): Transportation (38.7%), Industrial (34.4%), Commercial (10.7%), Residential (16.2%)
Fuel Share of Energy Consumption (1999E): Oil (40.8%), Natural Gas (14.5%), Coal (5.9%)
Fuel Share of Carbon Emissions (1999E): Oil (66.4%), Natural Gas (19.7%), Coal (13.9%)
Renewable Energy Consumption (1998E): 1,161 trillion Btu* (2% increase from 1997)
Number of People per Motor Vehicle (1998): 1.9 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified March 25th, 1994). Signatory to the Kyoto Protocol (April 29th, 1998)- not yet ratified.
Major Environmental Issues: Some forest damage from acid rain; air pollution from industrial and vehicle emissions; water pollution from urban wastes and agricultural runoff.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Climate Change-Kyoto Protocol.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

Links

For more information from EIA on France, please see:
EIA - Country Information on France

Links to other U.S. Government sites:
CIA World Factbook - France
U.S. Department of Energy on French Nuclear Sector
U.S. State Department Consular Information Sheet - France
U.S. Department of Commerce Country Commercial Guide - France
U.S. State Department Background Notes on France
U.S. Embassy in France

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Energy Information Administration

December 2001

Germany

Germany is one of the world's largest energy consumers. Because it has limited indigenous energy resources (except for coal), Germany imports most of its energy. Although the country is a major coal producer, it is a net coal importer.

The information contained in this report is the best available as of December 2001 and is subject to change.

GENERAL BACKGROUND

Germany is one of the largest economies in the world, a founding member of the European Union (EU), a North Atlantic Treaty Alliance (NATO) member, and a member of the Group of Seven (G-7) industrialized nations. It joined the common European currency, the euro, on January 1, 1999, and Frankfurt is the seat of the European Central Bank. The German mark will disappear in the first few months of 2002 as people trade in their marks for the new euro coins and currency.

Germany experienced slower economic growth during 2001 as compared to 2000, and may be on the verge of a slight contraction, according to a report published in October 2001 by Germany's top six economic research institutes. The events of September 11 had a negative effect on the entire world economy, and

recent German government estimates are that growth in 2001 may be just 0.75%. In September, business confidence in Germany fell to its lowest level since 1993. Export-led growth has been diminished as the global economy, and that of the United States in particular, loses momentum. Unemployment, a major issue in German politics in recent years, has decreased slightly since its high point in 1998. However, the current economic slowdown indicates that unemployment likely will not fall any further in the next 12 months.

Energy in Germany

German has relatively insignificant domestic energy sources and is heavily import-reliant to meet its energy needs. Coal accounted for 47% of domestic energy production in 1999, nuclear power 30%, natural gas 14%, renewable sources (including hydro) 6%, and oil 2%. However, oil accounted for 41% of consumption.

Energy policy in Germany is influenced heavily by EU regulations. The EU requires privatization and competition in member countries' energy markets, and Germany has been a leader in developing competitive energy markets.

Following reunification of the country in 1990, the major task of German energy policy was to merge successfully the radically different energy sectors of the East and West. West Germany had a diversified and mainly privately-owned system of energy supply with a high standard of energy efficiency and a commitment to environmental protection. In contrast, East Germany's energy sector was highly centralized, predominantly state-owned, and mainly dependent upon relatively "dirty" lignite (brown coal) as its primary fuel. To date, a great deal of progress has been made in conforming the former East Germany's energy sector to the standards of the West in the areas of privatization and environmental regulation.

OIL

Germany consumed about 2.8 million barrels per day (bbl/d) of oil in 2000, nearly all of which it imported, making Germany the third-largest oil importer in the world. German oil imports in 2000 came primarily from Russia (29%), Norway (18%), United Kingdom (13%), and the Libya (11%). German imports from Russia have remained unchanged in recent years. However, OPEC's share of German imports has decreased, while the share of North Sea oil from Norway and the United Kingdom has increased. For the first six months of 2001, preliminary estimates show Russian crude oil maintaining the same level as 2000, but imports from OPEC declining from 26% to 22% of total imports into Germany.

Germany produced around 64,000 bbl/d of crude oil in 2000, of which 16,000 bbl/d came from the German North Sea. Higher world oil prices in 2000 spurred a small increase in domestic crude oil production. Veba Oel is Germany's largest upstream company, with interests in 13 countries, including Germany, and production of about 160,000 barrels of oil equivalent per day.

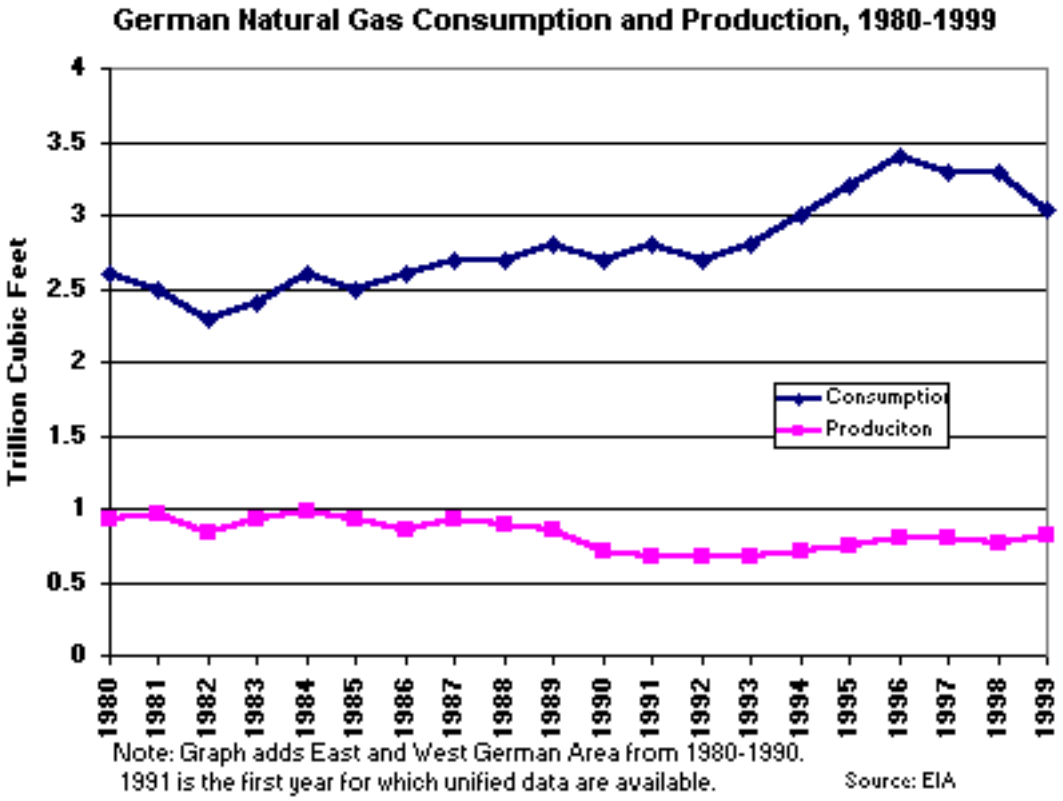
Germany's oil consumption was essentially unchanged in 2000 as compared to 1999. With the aid of hefty federal taxes on gasoline consumption, Germany had decreased its oil consumption in recent years,

with lower consumption in 1999 than in any year since unification. For instance, Germans pay about four times more for motor gasoline than Americans, despite having the most competitive retail gasoline market in Europe. German refinery throughput increased 1% in 2000, and refinery capacity utilization was at 95%.

The German downstream sector is in the process of completing two large mergers. In April 2001, Royal Dutch Shell and one of Germany's largest energy companies, RWE, agreed to form a new 50:50 venture called Shell & Dea Oil. The new company is managed by Shell, and in 2004 Shell's share will increase to 51%, and Shell will have the option to buy the remaining 49%, which it is expected to do. The new company will have about a 23% market share for gasoline stations and is poised to become Germany's largest refinery operation with capacity of about 460,000 bbl/d. However, in July 2001, BP acquired a majority stake (51%) in Veba Oel from E. On. Veba Oel, in addition to upstream assets valued at $2 billion, owns the Aral network of gasoline stations, which has a 25% market share, and refinery capacity of about 300,000 bbl/d. In return, BP gave E. On a majority stake (51%) of its 25.5% holding (through holding company Gelsenberg) of German gas distributor Ruhrgas, $1.63 billion in cash, and agreed to assume debts of $950 million. BP and E. On have the option to acquire the remaining stakes in Veba and Gelsenberg, respectively. When the second deal was announced, both deals came under increasing scrutiny by EU and German officials. The European Commission has endorsed a preliminary finding of risk of "collective dominance" by the German cartel office, to which it has delegated responsibility for assessing the downstream market effects. The European Commission is retaining responsibility for a 4-month investigation launched in late August on the effect of the mergers on the petrochemical industry.

NATURAL GAS

Germany is the European Union's second largest consumer of natural gas, after the United Kingdom. Germany produces insufficient natural gas to satisfy domestic consumption and satisfies most of its demand through imports. In 1999, the country produced 0.82 trillion cubic feet (Tcf) of natural gas from proven reserves of 11.5 Tcf, while consuming 3.0 Tcf (a decline of 300 billion cubic feet (Bcf) from 1998). This decline appears to have continued into 2000, as natural gas import prices rose steadily, and German gas suppliers instead drew down stored natural gas that had been purchased at cheaper prices. Although overall natural gas consumption fell 1.2% from 1998 to 1999, power sector usage fell a much larger 7%. E. On, Germany's second-largest largest utility, has asserted that power sector usage of natural gas fell even further in 2000, as it became cheaper to import electricity and maximize output from coal-fired facilities. In 1999, residential and other non-commercial consumers accounted for 53% of total demand, industry for 38%, and power stations, 9%. In 2000, Russia provided 37% of Germany's consumption, the Netherlands 26%, Norway 14%, and Denmark 1%. Natural gas consumption accounted for about 21% of total energy consumption in Germany in 1999. This share is expected to rise over the decade, especially for electric power generation as nuclear power is phased out. In September 2000, the *Deutsches Nordseekonsortium* (German North Sea Consortium), which is made up of Wintershall (40%, operator), BEB Erdgas und Erdoel (40%), BASF (12%), and RWE-DEA (7%), began production. The first offshore natural gas project in the German North Sea, the field is located about 190 miles from the German coast. New pipelines will transmit the anticipated 3.3 million cubic meters (116.5 million cubic feet) per day of production. The field is expected to produce for 16 years.



Ruhrgas remains Germany's dominant natural gas transmission company, accounting for about 60% of all natural gas sales. Years of Ruhrgas's monopolistic control of Germany's natural gas market have left Germany with a highly developed gas infrastructure. E. On, which already owns 42% of Ruhrgas through the deal with BP mentioned above and through E. On's partial ownership of another holding company of Ruhrgas, Bergemann, announced in November 2001, that it intends to buy the remaining shares of Bergemann, lifting E. On's share of Ruhrgas to 60%. E. On also sells to 35% of Germany's natural gas customers through its stakes in smaller companies Contigas and Thuga. E. On's ownership of Ruhrgas is already being investigated by the German cartel office, but perhaps more problematic is the fact that the outstanding shares of Bergemann are controlled by German coal group RAG, which is part-owned by E. On's rival company RWE. RWE may attempt to block the deal unless E. On gives RWE a larger share of RAG, of which E. On also is part-owner. Ruhrgas itself announced in October 2001, that it plans to bid for the gas division of Hungary's state-owned oil and gas group MOL.

Competition in Germany's natural gas market has developed slowly. Ruhrgas's main competitor, Wingas, was formed in 1993 by a joint venture between BASF's Wintershall (65%) and Russia's Gazprom (35%). Now, with its own domestic pipelines and links to export supply lines, Wingas has gained market share (19%), while Ruhrgas's share has decreased. Eni of Italy and Energie Baden-Wurttemberg (EnBW) may also bring more competition to the German gas market through their partnered acquisition of a majority stake in Gasversogung Suddeutschland (GVS). GVS currently gets 85% of its supply from Ruhrgas and 15% from Wingas, but the new Eni-EnBW holding company would likely have Eni supplying Libyan and Algerian gas to GVS. This acquisition of GVS is not yet certain, as there are remaining political and business obstacles.

Although Germany has one of the most liberalized energy sectors in the EU, full liberalization of the German natural gas market has not emerged as expected. According to EU law, member countries' natural gas transmission systems had to be open to third party access as of August 2000. While a German law was in place confirming a legal right for third party access, in practicality, new entrants have had difficulty gaining access. The creation of an independent regulator by the government is seen as key to making the market more accessible.

Pipelines

Germany is both a major destination point and major transit center for Europe's natural gas pipelines. Germany has five major pipelines on land, three from the North Sea to its coast, and several in the construction and planning stages. Pipelines from the Czech Republic transport Russian natural gas. The existing pipelines include: 1) The MEGAL pipeline from the Czech Republic to France through Germany, with annual capacity of 777 billion cubic feet (Bcf), 2) the TENP pipeline from the Netherlands to Germany and onward to Switzerland and Italy, with an annual capacity of 247 Bcf, 3) the STEGAL pipeline from the Czech Republic to Germany, with an annual capacity of 283 Bcf, 4) the NETRA pipeline from Etzel/Wilhelmshaven to Steinitz/Bernau, with an annual capacity of 706 Bcf and 5) the MIDAL pipeline from the port of Emden to Ludwigshafen with an annual capacity of 459 Bcf. The pipelines that bring Norwegian natural gas ashore are Norpipe, which lands at Emden, and Europipe I & II, which land at Dornum. From the Dornum receiving station, the natural gas is linked to either the NETRA pipeline or the metering station at Emden, where the MIDAL pipeline begins. The TENP pipeline can also bring in UK gas by way of the Netherlands. Wingas, which already owns the MIDAL and STEGAL pipelines, is planning to construct a pipeline with a capacity of 353-424 Bcf per year from Heppenheim in Southwest Germany to the states of Badem-Wurttemburg and Bavaria in Southeastern Germany. Ruhrgas is the largest shareholder in the MEGAL, TENP, and NETRA pipelines, though it has a majority stake only in the TENP pipeline. Ruhrgas, Fortum of Finland, and Wingas agreed in April 2001, to jointly develop plans to build a natural gas pipeline from Russia to Germany via the Baltic Sea.

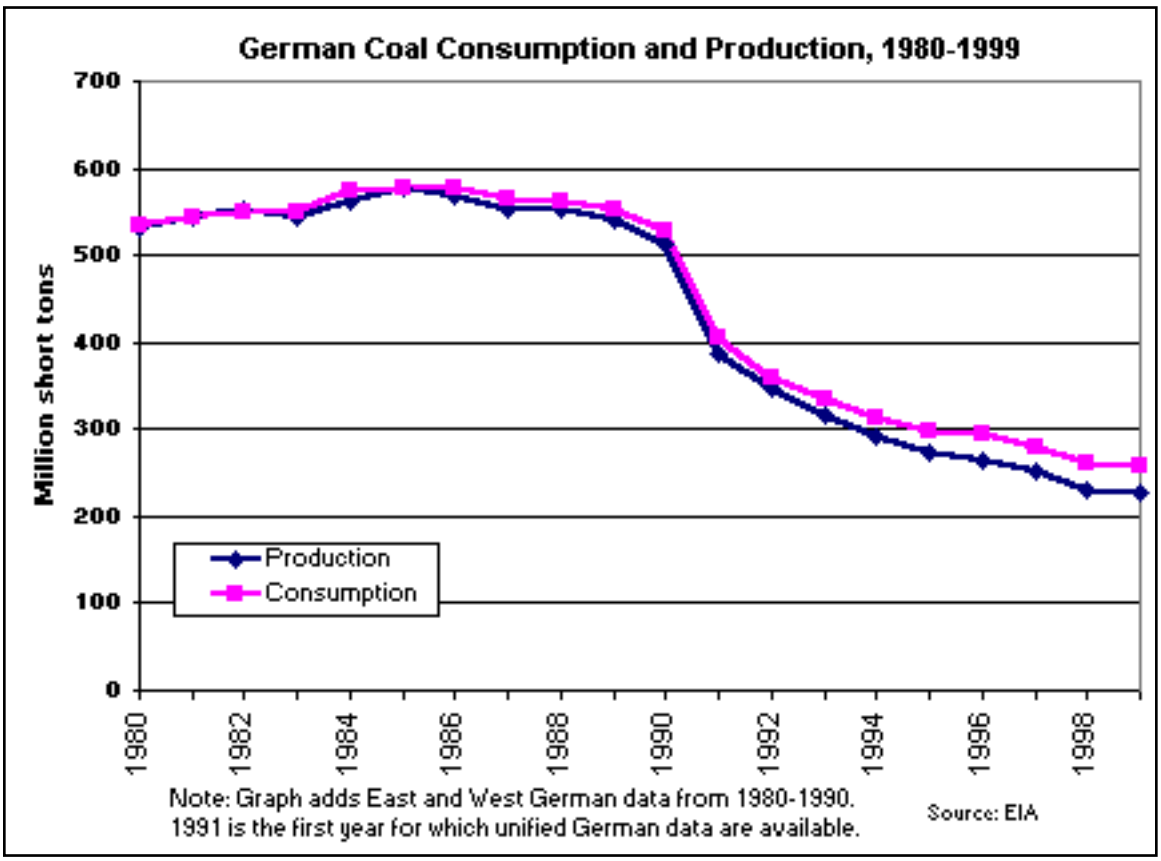
The large volumes of natural gas entering Germany, particularly on the Northwest coast around Emden, have given rise to efforts to establish Europe's third major natural gas hub at Bunde near the Dutch border. This is the point where the pipeline system of Gasunie of the Netherlands links up to the German networks of Ruhrgas, Wingas, and BEB. Spot trading by about a dozen companies is already occurring in this area, although volumes are small so far. Its location is in close proximity to where very large volumes of natural gas come into Germany, combined with European Commission proposals to unbundle integrated gas companies in the EU make the formation of an important hub likely. A conference was held in May 2001, on the subject of fostering natural gas trade at Bunde, which was attended by 40 companies, including all of Germany's major players.

COAL

Coal is Germany's only major domestic fuel source, accounting for 23% of energy consumption in 1999. Over 75% of German coal production is used for electricity generation, and coal accounts for over 50% of electricity generation. Hard coal production is expensive in Germany relative to other major coal producers, because German coal is located deep underground. Hard coal production has remained a viable industry only through heavy subsidization, which is being reduced, but not ended. Lignite, or "brown coal," production, however, is inexpensive in Germany. Germany is the world's largest lignite producer, with about one-fifth of global output, though output of lignite, most of which comes from the former East Germany, has fallen by about 40% since reunification.

In March 1997, the German government, the mining industry, and the unions reached an agreement on the future structure of subsidies to the German hard coal industry. Subsidies to the industry are to be

reduced from over DM10 billion ($5.5 billion) in 1997 to DM5.5 billion ($3 billion) by 2005. The agreement called for closure of 7-8 of Germany's 19 hard coal mines, resulting in an estimated decline in employment from 76,000 miners in 1997 to 36,000 by 2005. As of December 2000, 12 hard coal mines in Germany were still in operation.



In October 2000, the EC Energy Commissioner Loyola de Palacio demanded that Germany rework this subsidization scheme or risk legal action. The EC claimed that too much of that amount will be spent on subsidizing continuing production, and not enough devoted to ending production. This dispute was resolved in November 2000, by allocating part of the annual coal subsidy volume to a different category of coal aid, namely, to "mines that will definitely be closed at some point." In July 2001, the EC set out new proposals to maintain a significant coal industry in the EU (for reasons of energy security) that will allow Germany to provide billions of euros in aid over the coming years. Specifically, under the proposals German aid would fall to 2.8 billion euros in 2005, which does not differ greatly from the domestic agreements of 1997. The most recent aid package of 2 billion euros from January 1, 2002 to July 23, 2002, was approved by the EC in October 2001.

Decreasing coal production has brought about changes in the industry's organization. Two major producers, Saarbergen and Ruhrkohle Bergbau, merged to form Deutsche Steinkohle (DSK), which accounts for 96% of German production. DSK is part of the larger RAG group, which intends to diversify its holdings and focus less on coal as the sector shrinks in coming years. RAG is itself owned by E. On, RWE, Thyssen, and two holding companies.

As domestic production declines, Germany is emerging as a significant coal importer. Imports of hard coal, coke, and briquettes increased by 8.5% in 1999-2000, and are estimated to have increased even more in the first few months of 2001. The largest supplier is Poland, followed by Australia, South Africa, and Colombia, among others. The Federation of German Coal Importers expects German hard coal imports to exceed domestic production in 2001 or 2002, and to double over the next 20 years, as nuclear power is phased out and domestic production declines.

Germany's lignite production is separate from hard coal production. Lignite was the most important fuel in the former East Germany, and East Germany had been producing about three times as much lignite as West Germany in the years prior to reunification. Since reunification, wasteful and environmentally damaging mining methods practiced during Communist rule have been reformed. The industry also has been privatized. Lignite production in Germany fell from 308 million short tons (Mmst) in 1991 to 178 Mmst in 1999. Rheinbraun, a subsidiary of RWE, is responsible for most of German lignite production, and most of its lignite is used to produce electricity in RWE's power generation plants.

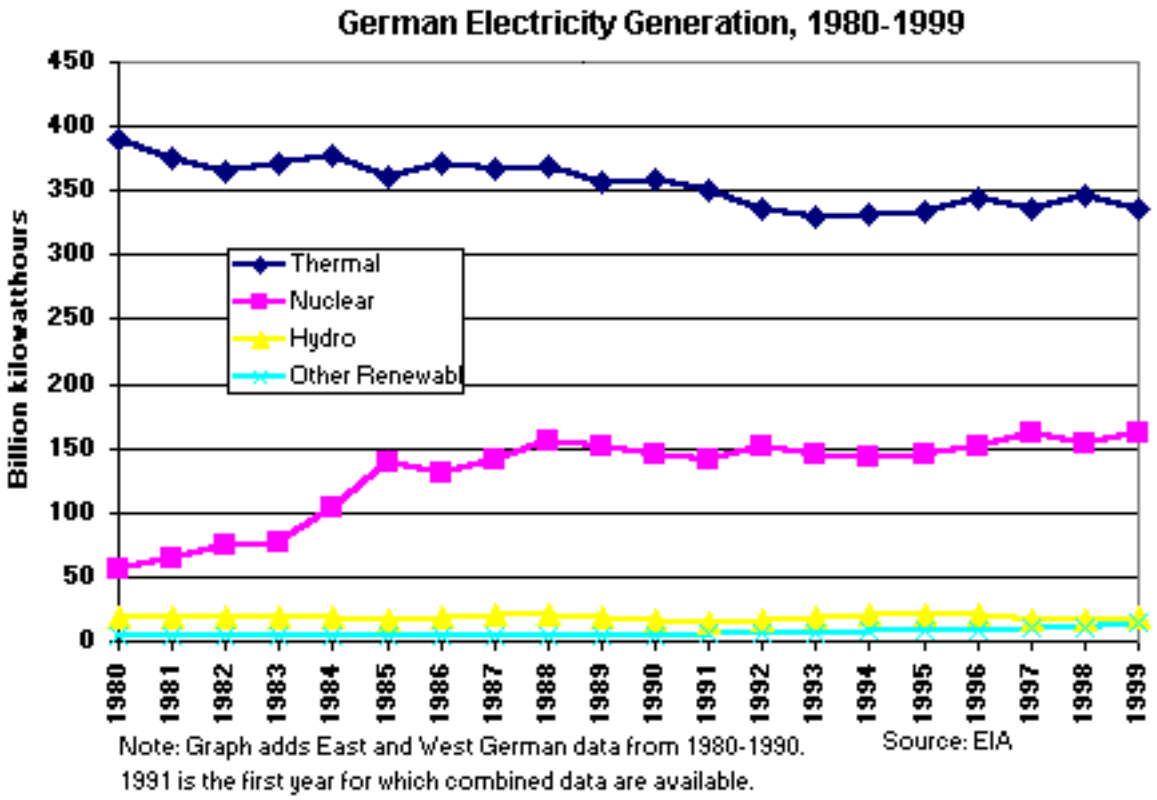
RAG has founded a new company called Minegas to exploit the mine gas from operational and closed mines for electricity generation. Minegas has already formed a consortium with several other German companies and a partnership with RWE. The target is to generate 450 gigawatts (GW) per year from mine gas.

ELECTRICITY

Germany has Europe's largest electricity market. In 1999, Germany generated 531.4 billion kilowatt hours (bkwh) of electricity, two-thirds of which came from fossil fuels (mostly coal), with the other other third coming mostly from nuclear power along with small amounts of hydropower and other renewable sources. Although Germany produced more electricity than it consumed, the country was a small net electricity importer, because of transmission losses, proximity to foreign sources of generation, etc. Germany has about 2,800 power plants and considerable excess generation capacity. The International Energy Agency predicts slow power demand growth in coming years. Major electricity companies recently have announced intentions to decrease generation capacity and output, and new power plant construction is at record lows. There is a new gas-fired, combined-cycle power plant with a capacity of 400 megawatts (MW) that was inaugerated by Kraftwerke Mainz-Wiesbaden near Frankfurt in March 2001.

The industry is undergoing changes in fuel mix and in organization. Efforts continue to phase out nuclear power and to increase reliance on renewable energy sources, most notably wind power, and on natural gas. RWE is developing fuel cell technology for electricity generation that it hopes to have functioning by 2004.

Sector Organization



In step with EU legislation, the German power market has become one of the most competitive in Europe. Liberalization of the electricity sector has progressed via agreements among major participants in the market and is not overseen by any regulatory body (like the natural gas sector). Some German market groups and the European Commission have called for an energy regulator, but so far the government has only created a six-member division of the cartel office dedicated to handling complaints about the electricity sector. About one million of Germany's 40 million electricity customers have switched to competitive suppliers. About 1,000 terrawatthours were traded in 2000. Liberalization has resulted in lower consumer prices and decreased employment in the industry, and is now sparking a wave of consolidation.

Six major electricity generation companies have dominated the German market in recent years, accounting for about 80% of generation. Major mergers are re-shaping the industry, potentially reducing the number of major players from six to three. RWE, the largest electricity company in Germany, has acquired VEW, the country's sixth-largest electricity producer. E. On, Germany's second largest electricity company, is set to aquire UK energy provider Powergen in a $16.9 billion deal. Powergen owns U.S. utility LG&E Energy, so when the deal is complete E. On will be world's second-largest energy provider after Electricite de France, and will have a significant presence in the U.S. E. On and Verbund of Austria agreed in July 2001, to combine their hydroelectric generation assets into one company, European Hydro Power, which would own about 200 plants with a total of 9,600 MW. In June 2001, the formation of Germany's third-largest energy company was announced by Hamburgische Electricitaets-Werke (HEW). A new holding company is being formed that is expected to be complete by 2003 that will control HEW, Berlin utility BEWAG, eastern German generation group VEAG, and lignite-mining company LAUBAG. Through a series of acquisitions, the company will be owned by HEW, Vattenfall of Sweden, and Mirant of the United States

The utility market is highly fragmented in Germany, with about 70 regional utilities and 900 municipal utilities, which together account for about 20% of power generation and about two-thirds of distribution. The Deutsche Verbundgesellschaft (DVG), which groups the main supra-regional utilities and deals with

national and international interconnections issues, and the Vereinigung Deutscher Elektrizitaetswerke (VDEW), which deals with economic and other technical issues. The regional utilities are grouped in the Arbeitsgemeinschaft Regionaler Energie Versorgungsunternehmen (ARE), the Stadtwerke are grouped in the Verband Kommunaler Unternehmen (VKU), and industrial producers are in the Vereinigung Industrielle Kraftwirtschaft (VIK).

Despite the overall success of liberalization, third party access to transmission networks remains a contentious issue. The *Verbandervereinbarung* that determines access to the grid system was first agreed in May 1998 and left transmission control mostly in the hands of the six major companies. After much criticism, a new Verbandervereinbarung was agreed in December 1999. This agreement has encountered even more criticism than its predecessor, and EU competition authorities have expressed concern. The most criticized aspects of the agreement include a lack of price transparency and the division of the German market into two distinct trading zones.

The German government has been critical of EU member governments that have not taken steps to open their power sectors in accordance with EU law. Currently, German electricity companies do have the right to block electricity imports from countries that deny access to foreign companies. The Minister of Economics, Werner Mueller, has proposed that German energy law be amended to extend the right to invoke bans, known to the government as "reciprocity clauses." However, the European Association of Transmission System Operators (ETSO) is urging Germany to adopt its policy of socializing network access costs such that costs of flows of electricity between grids is passed on to all users to promote exchange. Germany wants to pass export costs on to just exporters. If Germany does not agree to ETSO's policy, there is the possibility of Germany being excluded from the system. A decision will have to be taken by ETSO by the end of the year.

Nuclear Power

Currently, Germany ranks fourth worldwide in installed nuclear capacity, behind the United States, France, and Japan. Germany's 19 nuclear plants comprise about 21% of Germany's electric generation capacity, and about 30% of actual generation. E. On, RWE, HEW, and EnBW own nuclear generation capacity, with E. On holding stakes in 11 of Germany's 19 nuclear power reactors.

Nuclear power has become controversial since the September 1998 elections. The Greens, the environmental party that is part of the ruling alliance, are staunchly opposed to the continued use of nuclear power. Chancellor Schroeder had decided to close all 19 nuclear reactors in 2005, but he has since amended his position. The government formally signed an agreement with utility companies in June 2001 to gradually phase out nuclear power. Each nuclear plant is allowed to produce a finite amount of electricity, and plants will have a life span of 32 years. The deal could see the total elimination of nuclear power by 2021, as the newest nuclear plant opened in 1989. Generation volumes are transferable; if an older plant closes before reaching its production ceiling, its remaining allowable production can be transferred to a new plant.

There are few economically viable alternatives to quickly replace such a significant portion of the fuel

mix, especially in the wake of power-sector liberalization. As European markets become more liberalized and more price-sensitive, replacing the mostly amortized plants will prove difficult. Over the longer term, however, high costs (high fixed costs, long depreciation periods and long annual operating times) associated with nuclear generation could work to decrease nuclear generation's role in Germany's power sector. Nuclear installations currently are initiating programs to reduce production costs and waste disposal costs in order to become more price-competitive. In October 2000, E. On and RWE announced intentions to close a number of their less competitive (in terms of price) nuclear power plants. Some executives in Germany's nuclear industry have claimed that the June 2001 agreement is not irreversible, and that an electricity shortage and a change in the political climate might lead to a renewal of nuclear energy.

ENVIRONMENT

Germany has a strong commitment to protecting its environment. It has actively promoted the use of renewable energy, both under the Kohl government with the Electricity Feed Law, and now under Schroeder's government with eco-taxes. In Germany's eco-tax regime, energy tax (energy taxes are slated to increase 10% over the next three years) revenue is used to fund renewable projects. However, in late October 2001, the Chancellor's chief economic advisor indicated that these ecological taxes may be suspended for a year or two as a way to provide a stimulus to economy.

In 1999, Germany emitted 236.9 million metric tons of carbon from the consumption of fossil fuels. Germany ranks third in total carbon emissions within the G-7, after the United States and Japan. Germany signed the Framework Convention on Climate Change in Rio de Janeiro in June 1992 and ratified it on December 9, 1993. Signers of the agreement pledged to stabilize per capita CO_2 emissions in the year 2000 and beyond at 1990 levels. Under the Kyoto Protocol of December, 1997, Germany would have to go even further by reducing carbon emissions 8% by 2008-2012. This will be made more achievable given the sharp drop in total German carbon emissions since 1990, due mainly to decreased consumption of energy overall (and in particular lignite) in the former East Germany.

Sources for this report include: CIA World Factbook; Dow Jones; Economist Intelligence Unit ViewsWire; Petroleum Intelligence Weekly; Financial Times; Economist; Petroleum Economist; U.S. Energy Information Administration; WEFA World Economic Outlook.

COUNTRY OVERVIEW

President: Johannes Rau (elected May 1999)
Chancellor: Gerhard Schroeder (elected September 1998)
Independence: January 18, 1871 (reunification of West and East Germany took place on October 3, 1990)
Population (2001E): 83 million
Location/Size: Central Europe, bordering the Baltic Sea and the North Sea, between the Netherlands and Poland, south of Denmark/137,821 square miles (slightly smaller than Montana)
Major Cities: Berlin (national capital since 10/3/90), Hamburg, Munich, Cologne, Frankfurt, Essen, Dortmund, Stuttgart

Language: German
Ethnic Groups: German 91.5%, Turkish 2.4%, other 6.1% (made up largely of Serbo-Croatian, Italian, Russian, Greek, Polish, Spanish)
Religions: Protestant 38%, Roman Catholic 34%, Muslim 1.7%, unaffiliated or other 26.3%
Defense (8/98): Army, 230,600; Navy, 26,700; Air Force, 76,200 (including conscripts)

ECONOMIC OVERVIEW

Finance Minister: Hans Eichel
Currency: Deutsche Mark (DM)
Exchange Rate (12/02/01): 1 US Dollar = 2.1981 DM
Gross Domestic Product (GDP, nominal, 2000E): $1.87 trillion **(2001E):** $1.89 trillion
Real GDP Growth Rate (2000E): 3.0% **(2001E):** 1.1%
Inflation Rate (consumer prices, 2000E): 1.9% **(2001E):** 2.7%
Unemployment Rate (2000E): 9.6% **(2001E):** 9.5%
Exports of Goods (2000E): $549 billion
Imports of Goods (2000E): $492 billion
Major Trading Partners (2000): France, U.S., U.K., Italy, Netherlands
Major Export Products (2000): Machinery and transport equipment, manufactured goods, chemicals
Major Import Products (2000): Machinery and transport equipment, manufactured goods, other finished goods, fuels

ENERGY OVERVIEW

Minister of Economics: Werner Mueller
Proven Oil Reserves (1/1/01E): 380 million barrels
Oil Production (2000E): 139,000 barrels per day (bbl/d), of which 64,000 bbl/d was crude oil
Oil Consumption (2000E): 2.76 million bbl/d
Net Oil Imports (1999E): 2.7 million bbl/d
Natural Gas Reserves (1/1/01E): 11.5 trillion cubic feet (Tcf)
Natural Gas Production (1999E): 0.82 Tcf
Natural Gas Consumption (1999E): 3.0 Tcf
Coal Reserves (12/31/96E): 73.9 billion short tons
Coal Production (1999E): 226 million short tons (Mmst)
Coal Consumption (1999E): 258 Mmst
Net Coal Imports (1999E): 32 Mmst
Electric Generation Capacity (1/1/99E): 108 gigawatts
Electricity Production (1999E): 531.4 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Minister for Environment: Juergen Trittin
Total Energy Consumption (1999E): 13.9 quadrillion Btu* (3.6% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 229.9 million metric tons of carbon (3.7% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 170.4 million Btu (vs U.S. value of 355.8 million Btu)

Per Capita Carbon Emissions (1999E): 2.8 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 7,280 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.12 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (41.9%), Residential (24.2%), Transportation (21.5%), Commercial (12.3%)
Sectoral Share of Carbon Emissions (1998E): Industrial (37.4%), Transportation (25.6%), Residential (24.5%), Commercial (12.5%)
Fuel Share of Energy Consumption (1999E): Oil (41.4%), Coal (23.2%), Natural Gas (21.2%)
Fuel Share of Carbon Emissions (1999E): Oil (45.1%), Coal (36.3%), Natural Gas (18.6%)
Renewable Energy Consumption (1998E): 395 trillion Btu* (5% increase from 1997)
Number of People per Motor Vehicle (1998): 1.9 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 9th, 1993). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, but not yet ratified), Germany, as a member of the European Union, has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: Emissions from coal-burning utilities and industries and lead emissions from vehicle exhausts (the result of continued use of leaded fuels) contribute to air pollution; acid rain, resulting from sulfur dioxide emissions, is damaging forests; heavy pollution in the Baltic Sea from raw sewage and industrial effluents from rivers in eastern Germany; hazardous waste disposal.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling . Has signed, but not ratified, Air Pollution-Persistent Organic Pollutants.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

ENERGY INDUSTRIES

Major Energy Companies: *Oil:* Deutsche Shell, Esso, Ruhr Oel; *Natural Gas:* Ruhrgas, Wintershall/Wingas; *Coal:* DSK, RAG; *Electricity:* RWE, Viag, Veba
Major Refineries (crude capacity, bbl/d): Karlsruhe (285,800), Bayernoil (258,000), Schwedt (230,000), Gelsenkirchen (227,000), Leuna (214,000), Wilhelmshaven (225,000), Godorf (170,000), Wesseling (140,000), Esso Ingolstadt (105,000)

For more information from EIA on Germany, please see:
EIA - Country Information on Germany

Links to other U.S. Government sites:
CIA World Factbook - Germany
U.S. Department of Energy's Office of Fossil Energy's International section - Germany
U.S. Department of Energy on German Nuclear Sector
U.S. State Department's Consular Information Sheet - Germany
U.S. State Department's Country Commercial Guide - Germany
U.S. State Department Background Notes on Germany
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German Embassy in the United States
Germany's Nuclear Energy Policy Briefing Paper
European Commission Directorate General XVII (Energy)
International Energy Agency's Germany 1998 Review
Wingas
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August 2002

Greece

Greece is an important potential transit site for energy exports from the Caspian/Caucasus regions, with limited energy reserves of its own.

Note: Information contained in this report is the best available as of August 2002 and is subject to change.

BACKGROUND

Greece is among the smallest of the economies in the European Union (EU), but has enjoyed fairly strong growth over the past few years with relatively low inflation. In 2001, for instance, Greece's real gross domestic product (GDP) grew by an estimated 4.1%, while consumer prices increased at a 3.4% annual rate. For 2002, Greece's real GDP is expected to grow by 2.9%, while its inflation rate is forecast at 2.9%. Greece's unemployment rate has been trending downwards in recent years, from 11.9% in 1999 to 10.4% in 2001. For 2002, unemployment is forecast at 9.9%. Greece hopes to achieve long-term real GDP growth of 5.0%-5.5% over the next 15 years, but outside analysts believe that this is overly optimistic.

Greece's economic growth is being driven in part by infrastructure construction (and foreign investment) for the 2004 Olympic Games, which are to be held in Athens. Also, with Greece joining the "Eurozone" (its 12th member) in January 2001, the general government budget experienced a surplus in 2001 for the first time in over three decades, while interest rates have declined sharply. Meanwhile, since the mid-1990s, Greece has embarked on a series of macroeconomic and structural reforms, including measures aimed at slashing bureaucracy and at attracting foreign investment. The International Monetary Fund (IMF) and OECD both have called for continued efforts in these areas.

Relations between Greece and Turkey have improved recently, allowing for discussion of economic and energy cooperation. In March 2002, Greece and Turkey began discussions on resolving a decades-long disagreement over Aegean Sea boundaries. The two countries also are increasing cooperation in the economic and energy areas (see below). Greece is a major investor in the former Yugoslavia and its energy infrastructure is being integrated with that of the Balkan states. Improved relations with neighboring states could help Greece significantly in achieving its ambitious goal of becoming the major Balkan energy (oil, natural gas, electricity) hub by 2010 (at a cost of up to $14.5 billion).

OIL

Greece has limited oil reserves of 9 million barrels. The country produces 8,992 barrels per day (bbl/d) and is highly import reliant for its 406,000 bbl/d oil consumption (2001 estimate). Oil is Greece's most important fuel source, accounting for 63% of total energy consumption in 2000, a percentage that has remained fairly stable since the mid-1980s. Oil is imported primarily from Iran, Saudi Arabia, Russia, Libya and Egypt. The Middle East is expected to remain the major source of Greek oil supplies in coming years, although Russia could become more important as new pipelines are constructed.

Greece's oil industry is dominated by state-owned Hellenic Petroleum (HP), which was formed in 1998 from the former state oil company, Public Petroleum Corporation (DEP). HP conducts oil exploration, imports crude and products, operates three large refineries (one in Macedonia), and distributes and markets oil products. HP has been partially privatized in stages, with the state holding 60.1% at year-end 2000. HP's initial public offering (IPO) was in June 1998, when 23% of the company was sold, to a mixture of retail and institutional investors. In August 2001, the Greek government announced its intention to sell another 30% of HP. In July 2002, the Greek government announced that the sale of a 23.17% stake in HP should be completed by the end of August 2002. A joint venture between Russia's Lukoil and Greece's Latsis Group - which owns Greece's third-largest

refiner Petrola - has offered to pay $459 million for the stake (in June 2002, Russia's Yukos and Austria's OMV withdrew from the bidding). In early July 2002, a 15-day strike at HP by workers opposed to HP's privatization came to an end after a Greek court ruled that the strike was illegal.

Greece's oil production comes from the Prinos area in the Aegean Sea, off the coast of Kavala. The Prinos fields, which began production in 1996, are operated by the U.S., Greek, and Canadian North Aegean Petroleum Company (NAPC) consortium. In February 2001, a new oilfield was found offshore the Aegean island of Thasos (also near Kavala) by Kavala Oil, with production expected to be 7,000-7,500 bbl/d. The oil will be sold to HP for refining.

Greece's first oil exploration licensing round was held in 1996 and awarded six concessions. In May 2002, Greece announced that it would hold its second oil exploration licensing by early 2003. The round is to include both offshore and onshore areas in northwestern and southwestern Greece, plus unexplored blocks in the Ionian Sea. Exploration in the Aegean Sea is complicated by lack of agreement between Greece and Turkey delineating continental shelf boundaries.

HP is developing a $100-million, 143-mile pipeline to carry crude oil from the northern port city of Thessaloniki to HP's newly-acquired Okta refinery near Skopje, in the Former Yugoslav Republic of Macedonia (FYROM). Construction of the pipeline by HP's subsidiary El Pet Balkaniki began in November 1999. This pipeline will have the capacity to carry about 50,200 bbl/d. The pipeline will be managed in partnership with the FYROM, and will carry crude that currently is shipped by rail from Thessaloniki to Okta.

In January 1997, Greece, Bulgaria and Russia agreed on a plan to build an oil pipeline linking the Bulgarian Black Sea port of Burgas with Alexandropoulis on the Mediterranean coast of Greece. The proposed 178-mile, underground, Trans Balkan pipeline would allow Russia to export oil through the Black Sea while bypassing Turkey's Bosporus and Dardanelles Straits. However, the

$600-$800 million project has been stalled by a wide range of technical and economic disputes. Russia has affirmed that the pipeline, with proposed capacity ranging from 600,000 bbl/d to 800,000 bbl/d, will work at least at 50% of its capacity, and Russian oil major Yukos has expressed its interest in the project, which may ease concerns over filling the pipeline. Greece also has discussed with Kazakhstan the possibility of shipping oil through the pipeline. In May 2002, Bulgaria said that it hoped an agreement on the pipeline could be signed by the end of 2002, with the main outstanding issue being the percent stake that each country will take in the project.

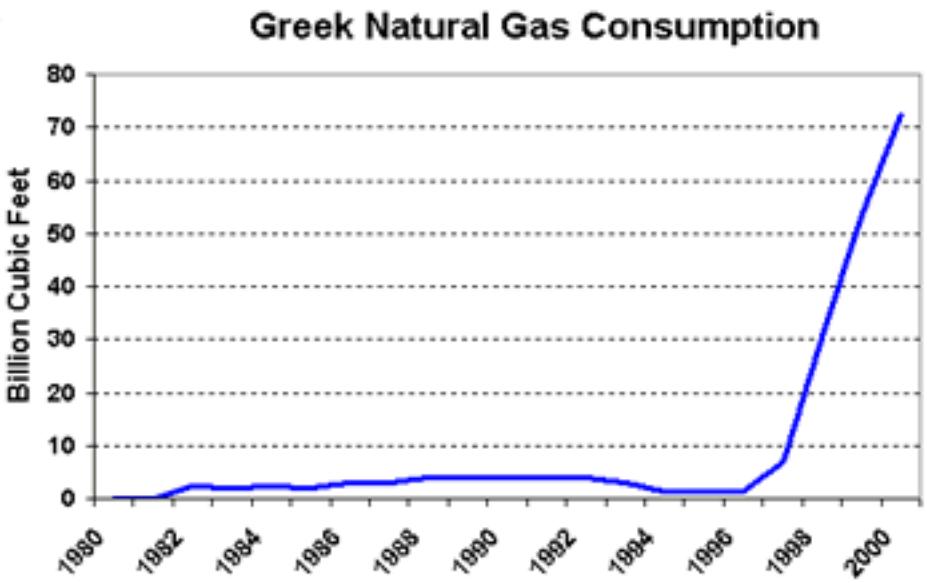
Downstream

HP owns about half of Greek refining capacity, which totalled 406,500 bbl/d as of January 1, 2002. HP's Aspropyrgos facility refines about 140,000 bbl/d, while the Thessaloniki refinery has a 66,500-bbl/d capacity. Two private refineries, owned by Motor Oil Corinth Refineries and Petrola Hellas, are export-oriented, selling only limited volumes to the national market. Motor Oil, which had been majority-owned by Saudi Aramco, was partially sold off to Petroventure of Jersey in July 2001, a joint venture of Aramco and Vardinoyannis, which separately each own 16.4% of Motor Oil.

HP also is the largest player in the Greek retail oil market at a 26% market share. U.S.-based Texaco and British-Dutch Royal Dutch/Shell decided in 2000 to trade Texaco's Greek retail assets for some of Shell's United Kingdom retail assets.

NATURAL GAS

With natural gas reserves of only 18 billion cubic feet (Bcf), Greece produces negligible amounts of natural gas. Consumption, however, has increased significantly over the past few years, increasing from only 1 billion cubic feet (Bcf) in 1996 to 72 Bcf in 2000. Consumption is expected to continue increasing, possibly tripling over the next ten years. About 80% of Greece's natural gas imports currently come from Russia, and 20% from Algeria.



The Greek natural gas industry is controlled by the state-owned Greek Public Gas Company (DEPA), which was created in 1988 in an attempt to diversify the primary energy supply by increasing the role of natural gas. DEPA is 35% owned by HP, with the Greek government owning the rest. In April 2002, plans were announced to sell off 35% of the government's share of DEPA, with possible buyers including Russia's Gazprom, Germany's Ruhrgas, and Algeria's Sonatrach. Eventually, the plan is for DEPA to be only minority-owned by the state.

DEPA began importing natural gas from Russia via Bulgaria in July 1997 through a Bulgarian pipeline (Greece's only operational gas pipeline), and the company has contracts to supply natural gas to electric utilities and industrial companies. In March 2001, DEPA and Gazexport (part of Gazprom of Russia) agreed on an importation deal for 2002 which includes a 5% price increase. Under the EU Gas Directive, 20% of Greece's natural gas market was to have been opened to competition by August 2000, but Greece was granted extra time. Under current Greek law, companies other than DEPA can only import gas to generate electric power destined for export.

Recent improvements in Greek-Turkish relations are facilitating discussions of energy cooperation. For instance, Greece and Turkey agreed in July 2000 to work together to develop connections between their natural gas networks. This commitment was reaffirmed at "The EU and Black Sea economic cooperation conference" in September 2001 by the Turkish officials at the conference. Senior Greek and Turkish officials have signed an agreement at EU headquarters to study how best to develop natural gas connections. The two countries have agreed to work with the EU-sponsored Interstate Oil Gas

Transport to Europe (INOGATE) project, which provides technical assistance to modernize oil and gas transport in central Europe and Asia in order to work toward European pipeline linkage to Caucaus and Asian oil and gas. In March 2001, Greece signed an agreement with Armenia and Iran to strengthen economic and energy cooperation. Discussions included the possibility of an EU-subsidized natural gas pipeline from Iran through either Armenia and Ukraine or Turkey and Greece.

Greece received its first liquefied natural gas (LNG) shipment in November 1999, beginning a 21-year contractual agreement between Algeria and Greece under which DEPA will purchase gas from Algeria's Sonatrach. Greece has one LNG terminal at Revithoussa, near Athens, with a capacity of 23 Bcf per year. A feasibility study is underway to determine whether to construct an underwater gas pipeline connecting Italy and Greece; if this pipeline does not come to fruition, it is possible that another LNG terminal will be constructed in Greece or that the terminal at Revithoussa will be expanded.

On December 15, 1997, Russia and Turkey signed a 25-year deal under which the Russian gas company, Gazprom, would construct a new natural gas export pipeline (called "Blue Stream") to Turkey for delivery capacity of around 565 Bcf annually, with initial deliveries possibly starting in 2002. The $3 billion, 758-mile dual pipeline is slated to run from Izobilnoye in southern Russia, to Dzhugba on the Black Sea, then under the Black Sea for about 247 miles to the Turkish port of Samsun, and on to Ankara. Natural gas supplies through the Blue Stream pipeline are slated to begin in October 2002, with Russia scheduled to deliver 70.6 Bcf of natural gas to Turkey via the pipeline this year. By 2009, Blue Stream is expected to reach peak capacity of 565 Bcf per year. Over the course of the 25-year agreement, Turkey will import 14.1 Tcf of natural gas from Russia via Blue Stream. Eventually, the Blue Stream project could be extended onwards to other Mediterranean countries, including Greece.

Along these lines, Greece and Turkey signed an agreement on March 28, 2002 which calls for extending the natural gas pipeline from Iran to Turkey

into Greece. Reportedly, the 175-mile-long pipeline (125 miles in Turkey, 50 miles in Greece), expected to be completed by 2005, would connect Ankara to Alexandroupolis in northern Greece at a cost $300 million. The pipeline initially will transport around 17.7 Bcf of natural gas per year. Eventually, natural gas could be transported to Europe via Bulgaria or via an undersea pipeline to Italy, where gas demand -- especially for electric power generation -- is expected to grow rapidly in coming years. A deep water option could be extremely expensive, however, making an overland route more likely. Also, in April 2002, Azerbaijan said that it could start supplying Greece with natural gas in 2006-2007 through the Baku-Tbilisi-Erzurum pipeline and the Turkey-Greece pipeline extension.

COAL

Lignite ("brown coal"), a brownish-black coal of low quality used almost exclusively for steam-electric power generation, is Greece's only significant fossil fuel source. Greece's lignite reserves total 3,168 million short tons (Mmst). The largest deposits are at Ptolemais and Amintaio, in northern Greece. The country has no hard coal reserves, and imports hard coal from South Africa, Russia, Venezuela, and Colombia. Domestic production has been partly opened to private companies, but the Public Power corporation is still the largest producer, as well as consumer.

ELECTRICITY

In 2000, Greece generated 49.6 billion kilowatthours (Bkwh) of electricity, around 90% of which was thermal, 10% hydropower, and 1% solar (percentages do not equal 100% due to rounding). Most of the thermal is lignite-fired, with some oil-fired plants. New plants will be gas-fired for the most part. Electricity demand has been growing steadily -- around 3.4% per year -- meaning (according to the Energy Regulatory Authority, RAE) that some 6,000 megawatts (MW) of additional capacity will be needed to guarantee supply through 2015. Greek authorities are concerned that electrical generation capacity will be insufficient for the 2004 Olympic Games in Athens. Natural gas will become an important fuel for electricity generation as planned gas-fired plants are constructed.

Greece's Public Power Corporation (I.PPC) is a state-owned monopoly that controls electric production, transmission, and distribution in the country. A flotation of 10%-15% of I.PPC is planned by the end of 2002. In February 2001, with the partial liberalization of Greece's power market (35% was opened to competition) in accordance with the EU's Electricity Directive, I.PPC lost its legal monopoly on electricity generation but remains the sole distributor. Other EU member countries had to open up their electricity markets by February 1999, but Greece was granted a two-year waiver in recognition of its unique situation: it borders no other member state, and much of its territory is comprised of islands that cannot be linked into the national grid. Given the lead time on construction of new power plants, it will be a while before competing generators are functioning, so I.PPC still has an effective production monopoly. The OECD has urged Greece to break up I.PPC, and plans are for the Greek power sector to be completely liberalized by 2005. Management of the Greek power liberalization process is the responsibility of RAE, the Greek regulating authority.

Greece's power network currently is connected with the networks of Albania, the Former Yugoslav Republic of Macedonia (FYROM), and Bulgaria, allowing Greece to export electricity to Kosovo in Yugoslavia, through Albania and FYROM (although transmission problems in those countries have sometimes prevented much of this electricity from reaching its intended recipients). In June 2001, energy ministers from Albania, Bosnia and Herzegovina, Bulgaria, Greece, FYROM, and Romania signed a memorandum for the creation of a competitive energy market in the Balkans. Greece would like to upgrade its link with Bulgaria and to Europe via Croatia and Bosnia. Greece is involved in a number of projects to link its electric grid with neighboring countries. In July 2002, Greece and Italy completed work on a 500-megawatt (MW) cable (in both directions) under the Ionian Sea to link their national power grids. The 102-mile cable links Otranto, Italy, and Aetos, Greece. The project is a joint venture between ENEL (75%) and PPC (25%).

Improved Greek-Turkish relations also are affecting the Greek electricity sector. In January 2000, a Greek-Turkish-U.S. (Copelouzos-Gama-ExxonMobil) consortium announced plans to construct a gas-fired power plant in Greece. The plant will have a capacity between 400 MW and 600 MW and will be used to export electricity to Turkey in addition to helping supply increasing Greek domestic demand. Electricity will be exported via the new 400-kilovolt (kV) transmission line to be constructed between Filippoi (Greece) and Hamidabad (Turkey). Greece and Turkey also hope to reach agreement by 2006 on linking the two countries' power grids.

Renewable electricity generation projects are on the rise in Greece, and the government has established the Centre for Renewable Energy Sources (CRES), under the Development Ministry, to promote renewable energy. CRES estimates that 15% of the country's electricity needs can be produced by wind farms, with installed wind-power capacity possibly expanding from 270 MW at present to 2,000 MW by 2010. The EU requires that member states produce 12% of their electricity from renewable sources by 2010, and this appears easily achievable for Greece -- assuming that regulatory hurdles and technical problems (i.e., the need to extend Greece's power grid to the islands where wind power is generated) can be overcome. Already, wind farms exist on a number of Greek islands (Crete, Evia, Andros, Samos, etc.) and 20% of households use solar water heaters. Islands in the western part of Greece are connected to the mainland system by submarine cables.

The use of solar power in Greece reduces the need for conventionally generated energy by about 1.4 billion kilowatthours per year. A 50-MW parabolic trough-type solar power plant is under construction in Crete. DEH is planning a 100-kilowatt photovoltaic (PV) park for Gavdos island, in addition to already-existing PV capability on the island. Energy Photovoltaics (a German-Italian-American consortium) announced in July 2001 that it will build a $22 million solar plant in Kilkis with power generation capacity of 5 MW.

In February 2002, a report by Merrill Lynch estimated that wind power

capacity additions in Greece would be 26 MW in 2002, 19 MW in 2003, 54 MW in 2004, and 56 MW in both 2005 and 2006. In June 2001, Gemesa of Spain signed an agreement with Hellenic Energy and Development Company to invest 420 million euros to develop wind power plants with a total capacity of 460 MW by 2005. Windforce of the UK plans to develop $800 million of projects in the EU, including three wind farms in Greece (at Makronisos, Kilkis, and Lakonia) with a total capacity of 650 MW.

COUNTRY OVERVIEW

President: Konstantinos "Kostis" Stephanopoulos; since May 5, 1995
Prime Minister: Konstandinos Simitis (Panhellenic Socialist Movement - Pasok); since January 19, 1996
Independence: 1829 (from the Ottoman Empire)
Population (7/01E): 10.6 million
Location/Size: Southern Europe, bordering the Aegean, Ionian and Mediterranean Seas/131,940 sq. km. (51,146 sq. mi) ; roughly the size of Alabama
Major Cities: Athens (capital), Thessaloniki, Piraeus, Patras
Languages: Greek (official), English, French
Ethnic Groups: Greek (98%); other (2%)
Religion: Greek Orthodox (98%), Muslim (1.3%), other (0.7%)
Defense (8/98): Army (116,000), Navy (19,500), Air Force (33,000), Conscripts (112,700)

ECONOMIC OVERVIEW

National Economy and Finance Minister: Nikos Khristodoulakis
Currency: Euro
Market Exchange Rate (8/8/02): US$1 = 1.026 Euro
Nominal Gross Domestic Product (GDP, 2000E): $113 billion
Real GDP Growth Rate (2001E): 4.1% **(2002F)**: 3.8%
Unemployment Rate (2000E): 11.4% **(2001F)**: 10.7%
Inflation Rate (2001E): 3.4% **(2002F)**: 2.9%
Major Trading Partners: Germany, Italy, other OECD Europe
Major Export Products: Manufactures, food and beverages, petroleum

products
Major Import Products: Manufactured consumer goods, capital goods, crude oil, food products
Merchandise Exports (2000E): $15.8 billion (half to the EU, 6% to the US)
Merchandise Imports (2000E): $33.9 billion (two-thirds from the EU)
Current Account Deficit as a % of GDP (2001E): -6.2% **(2002F)**: -7.8%
External Debt (2000E): $57 billion

ENERGY OVERVIEW

Minister of Development: Apostolos-Athanasios Tsokhatzopoulos
Proven Oil Reserves (1/1/02E): 9 million barrels
Oil Production (2001E): 8,992 barrels per day (bbl/d), of which 4,992 bbl/d is crude oil
Oil Consumption (2001E): 406,000 bbl/d
Net Oil Imports (2001E): 397,008 bbl/d
Crude Oil Refining Capacity (1/1/02E): 406,500 bbl/d
Major Crude Oil Import Sources: Persian Gulf OPEC
Natural Gas Reserves (1/1/02E): 18 billion cubic feet (Bcf)
Natural Gas Production (2000E): 0.1 Bcf
Natural Gas Consumption (2000E): 72 Bcf
Coal Reserves (2000E): 3,168 million short tons (all lignite)
Coal Production (1999E): 67.2 million short tons (Mmst)
Coal Consumption (2000E): 70.5 Mmst
Electric Generation Capacity (2000E): 10.1 gigawatts
Electricity Production (2000E): 49.6 billion kilowatthours (Bkwh)

ENVIRONMENTAL OVERVIEW

Minister of Environment, Town Planning, Public Works: Vasso Papandreou
Total Energy Consumption (2000E): 1.3 quadrillion Btu* (0.3% of world total energy consumption)
Energy-Related Carbon Emissions (2000E): 26.8 million metric tons of carbon (0.4% of world total carbon emissions)
Per Capita Energy Consumption (2000E): 126.1 million Btu (vs U.S. value

of 351.0 million Btu)
Per Capita Carbon Emissions (2000E): 2.5 metric tons of carbon (vs U.S. value of 5.6 metric tons of carbon)
Energy Intensity (2000E): 9,653 Btu/ $1995 (vs U.S. value of 10,918 Btu/ $1995)**
Carbon Intensity (2000E): 0.19 metric tons of carbon/thousand $1995 (vs U.S. value of 0.17 metric tons/thousand $1995)**
Sectoral Share of Energy Consumption (1998E): Industrial (34.5%), Transportation (35.2%), Residential (20.9%), Commercial (9.4%)
Sectoral Share of Carbon Emissions (1998E): Industrial (39.2%), Transportation (27.5%), Residential (21.5%), Commercial (11.8%)
Fuel Share of Energy Consumption (2000E): Oil (63.2%), Coal (27.8%), Natural Gas (6.0%)
Fuel Share of Carbon Emissions (1999E): Oil (60.2%), Coal (36.8%), Natural Gas (3.0%)
Renewable Energy Consumption (1998E): 93 trillion Btu* (2% decrease from 1997)
Number of People per Motor Vehicle (1998): 3.1 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified August 4th, 1994). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, ratified along with EU in May 2002), Greece has agreed to limit greenhouse gas increase to 25% above 1990 levels by the 2008-2012 commitment period. Within the EU, each country has a different commitment.
Major Environmental Issues: Air pollution and water pollution.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94 and Wetlands. Has signed, but not ratified, Air Pollution-Persistent

Organic Pollutants, Air Pollution-Volatile Organic Compounds.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 2000.

OIL AND GAS INDUSTRIES

Organization: Hellenic Petroleum -- the state petroleum company; DEPA -- the state-controlled gas company; Public Power Corporation - the state-owned utility

Major Refineries (capacity - bbl/d, 1/1/02E): HP Aspropyrgos (140,000), Motor Oil Aghii Theodori (100,000), Petrolas Hellas Elefsis (100,000), HP Thessaloniki (66,500)

Major Ports: Piraeus,Thessaloniki, Patras

Sources for this report include: CIA World Factbook 2000; Dow Jones News wire service; Economist Intelligence Unit ViewsWire; Financial Times; Oil and Gas Journal; Petroleum Economist; International Market Insight Reports; DRI/WEFA, Global Power Report; CNN Interactive; National Trade Data Bank; Petroleum Intelligence Weekly; U.S. Energy Information Administration; World Markets Energy.

LINKS

For more information on Greece, see these other sources on the EIA web site:
EIA Data for Greece
European Union Fact Sheet

Links to U.S. government other sites:
CIA World Factbook, Greece
U.S. Department of Energy's Office of Fossil Energy's International section, Greece
U.S. Department of State Consular Information Sheet, Greece
U.S. Embassy and U.S. Information Agency, Athens, Greece

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The Greek Connection
Greek Government online
Greek Government information
European Regional Development Fund and Cohesion Fund
European Commission Directorate General for Energy and Transport
European Commission Directorate General for Environment
European Commission Directorate General for the Internal Market
EU Council, Economic Policy Coordination
International Energy Agency 1998 review of Greece
Hellenic Petroleum (HP)

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Printer-Friendly Version, PDF Version, PDA Version

December 2001

Italy

Italy is almost entirely dependent on imports to meet its energy needs. The country's heavy reliance on foreign oil and gas sources such as Libya and Algeria has made energy security and diversification of

energy sources top concerns.

The information contained in this report is the best available as of December 2001 and is subject to change.

BACKGROUND

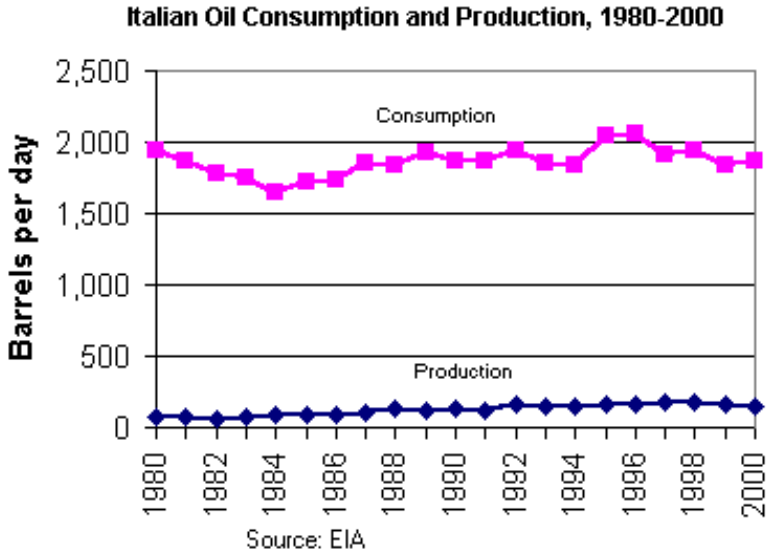
Italy is one of the world's largest economies, a founding member of the European Union (EU), a North Atlantic Treaty Alliance (NATO) member, and a member of the Group of Seven (G-7) industrialized nations. It joined the common European currency, the euro, on January 1, 1999.

Italy's 59th government since 1945 came to power in June 2001, headed by Prime Minister Silvio Berlusconi, leader of Forza Italia (who was also prime minister in 1994). The government is a coalition called "House of Freedoms" that gained a majority in both the Chamber of Deputies and the Senate, giving this government more power to implement its policies. Prior to Berlusconi's government, Italy had achieved a major economic policy objective: the reduction of its budget deficit to under 3% of gross domestic product (GDP) in order for Italy to comply with the EU's Stability and Growth Pact. The current government will have to continue to work to maintain this in light of low economic growth prospects in the near term. This slowdown has complicated the new government's promises radical economic reforms and tax cuts, but an economic slowdown has meant that with tax revenue decreases, making achievement of the government's target of a 1.1% budget deficit more difficult. The government has instead focused on cutting expenditures by streamlining public administration and on increasing revenues by taxing or confiscating grey and black market assets. Economic growth for 2001 is forecast at 1.5%.

EU membership has initiated important changes in Italy's energy sector, requiring privatization of the country's dominant energy monopolies. Italy's energy sector has been undergoing considerable restructuring in recent years. Eni, the partially state-held oil and gas conglomerate, along with its main subsidiaries, Agip (hydrocarbons exploration and production) and Snam (gas supplies and distribution), and the state-owned electricity company, Enel, all have been partially privatizated. The Italian government sold off shares of Eni between 1995 and 1998, and now holds 35% of the company. Privatization of Enel stalled but then moved ahead with a 32% sale in November 1999.

With limited domestic energy sources, Italy is highly dependent on energy imports. Historically, the country has relied heavily on imported oil, much of it from North Africa (mainly Algeria). In recent years, oil consumption has declined (although Italy remains one of the largest oil consumers in Western Europe) in favor of natural gas. Natural gas is a much cleaner fossil fuel that helps Italy to meet domestic, European, and broader international requirements for a cleaner environment. As with oil, North Africa is a large exporter of natural gas to Italy. There have been concerns that this reliance on North African sources has potentially negative implications for Italian energy security.

OIL



Italy holds 622 million barrels in proven oil reserves. In 2000, the country produced an estimated 145,000 barrels per day (bbl/d) of oil and consumed about 1.9 million bbl/d, making it more than 90% reliant on imports and one of Europe's largest oil importers. Former Italian colony Libya is Italy's main source of oil imports, and other major import sources (in order of magnitude) include Iran, Saudi Arabia, and Iraq. About 70% of Italy's oil imports are from the Middle East and North Africa. It is estimated that oil's share of Italy's energy consumption fell to just under 50% for the first time in over 20 years in 2000. Italy is in the process of decreasing its reliance on oil, especially for heating and electricity generation. Heating oil consumption in 2000 was about one-third of that of 1981 and fuel oil consumption has fallen 38% since 1995. Natural gas consumption is expected to rise as oil consumption falls in coming years.

Eni is Italy's largest integrated oil company, and the sixth-largest publicly traded oil company in the world. It dominates the upstream and downstream sectors in Italy. Worldwide petroleum production is approximately 1.3 million barrels of oil equivalent per day (boe/d) and the company had proven reserves at the end of 1999 of about 5.5 billion barrels of oil equivalent. Eni's Agip (Azienda Generale Italiana Petroli) division conducts hydrocarbon exploration and production and Eni's AgipPetroli subsidiary conducts downstream petroleum operations. Eni plans to increase production to 1.5 boe/d by 2002. In order to do this, Eni acquired British-Borneo Oil for $1.2 billion and Lasmo Oil for $8.5 billion in 2000. This increased Eni's reserves to 6 billion barrels of oil equivalent. These acquisitions give Eni interests in many areas, but especially in the North Sea and North Africa. Eni is very active in Iran, and in June 2001, Eni finalized a $1-billion contract with the government of Iran to develop the Darkhuwain oilfield.

Exploration and Production

Italy's oilfields are in the north of the country, onshore and offshore along the Adriatic and on and offshore Sicily. Two large Eni-operated fields, Villafortuna and Aquila have declined in recent years. In order to bolster energy security and reduce dependence on foreign sources, Italy is in the process of increasing domestic production. Eni is the operator in a joint venture with Britain's Enterprise to develop 600 million barrels of oil equivalent (including oil and associated natural gas) at Val d'Agri, in the southern Apennine region, considered to be Europe's most promising onshore development area. Output of 11,000 bbl/d from the fields began in 2000, but limited transport capacity prevented production reaching its target capacity of over 100,000 bbl/d. Construction on the 85-mile (136-kilometer), 150,000-bbl/d capacity pipeline connecting the fields to the Taranto refinery was completed by Enterprise in October 2001. Eni aims to have the fields producing at 47,000 bbl/d by the end of 2001, and 100,000 bbl/d by 2004.

In the Tempa Rossa field, neighboring the Val d'Agri fields, Eni is developing over 400 million barrels of oil equivalent in a joint venture with Enterprise (25%), TotalFinaElf (25%), and ExxonMobil (25%). Tempa Rossa has much heavier crude than Val d'Agri, and Eni reportedly plans to drill only 7 wells at Tempa Rossa (as opposed to 42 at Val d'Agri). Eni hopes to be producing 44,000 bbl/d by 2003. The crude oil will be treated on-site, and sent in batches through the new pipeline to the Taranto refinery.

Downstream

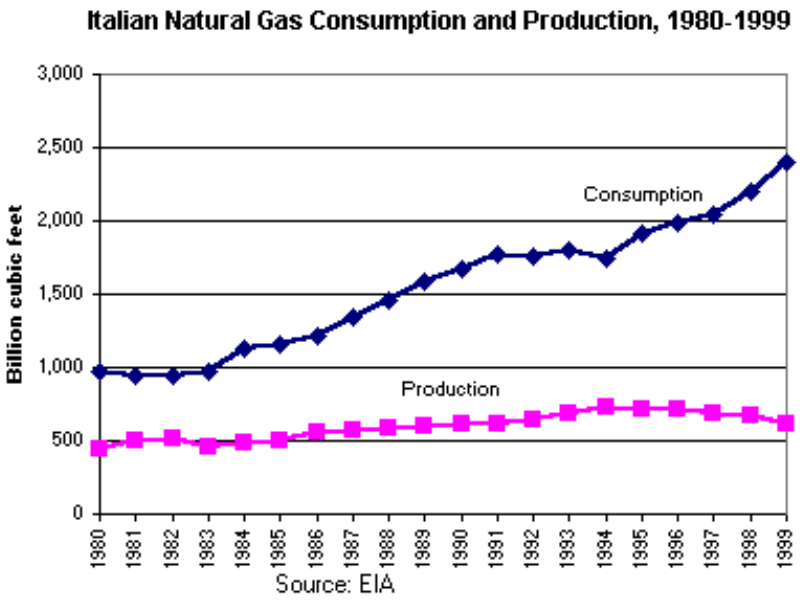
To ensure access to foreign oil, the Italian government has promoted Italy as an export refining center since the 1970s. There are large facilities along the Mediterranean coast and on Mediterranean islands, capable of processing a wide range of crude oils from North Africa and the Persian Gulf. As a result, Italy now has

Europe's largest surplus of refining capacity. However, refinery throughput was only 76% of capacity in 2000, and Italy is importing almost as much refined products as it exports. ENI operates six of the 16 major refineries in Italy. While underutilized, the Italian refineries remain attractive because of their ability to handle large tankers and process many different fuel types, and also because of their catalytic and hydro cracking abilities. ExxonMobil has a facility at Augusta on the Sicilian coast.

Italy has more gas stations than any other country in Europe. The government maintains that reducing the number of stations will help to reign in the cost of gasoline, but little progress has been made on this. In June 2000, in further efforts to address steadily increasing gasoline costs that went above $4 per gallon in the summer of 2000, Italy's antitrust commission found seven oil companies guilty of price-fixing at the retail level. The companies were fined about $300 million, and in November 2000 the courts upheld the ruling in an appeal but reduced the fine to about $200 million. In 2001, Eni sold 261 gasoline stations to Tamoil and 257 stations to other retailers as part of Eni's plan to concentrate more on upstream activities.

NATURAL GAS

Italy has natural gas reserves of 8.1 trillion cubic feet (Tcf). In 1999, the country produced 618 billion cubic feet (Bcf) and consumed 2.4 Tcf, relying on imports for roughly 75% of total consumption. Italy's natural gas consumption has risen substantially since imports began in the early 1970s with Eni gas purchases from the Netherlands and Russia. Italy currently is the third largest natural gas market in Europe, behind Germany and the United Kingdom. Natural gas use has increased substantially in recent years, especially for power generation. Natural gas now represents about 32% of total energy consumed in Italy, and this share is expected to grow in the coming years to 37% by 2010, according to Eni. Residential and commercial sectors acount for 36% of the market, industrial 33%, and electricity generation 31%. According to Enel officials, by 2010, 60% of electricity in Italy will be generated by natural gas and only 10% by oil.



Sector Organization

Eni, and its subsidiary Snam, control most of the Italian natural gas market. Eni supplied about 87% of the natural gas consumed by Italy in 2000 through its domestic production and contracted imports. Edison Gas, an independent power producer (IPP), is the only other significant company in the Italian natural gas sector, supplying about 5% of the market, but increasing rapidly, as natural gas from its new contract with Russia's Promgas is due to increase to 70.6 Bcf per year in 2002. Italian electricity conglomerate Enel also imports gas directly for its own generation activities. Italy has had very high rates of return for natural gas suppliers, transporters, and distributors, when compared with other European countries. Italian consumers pay among the highest natural gas prices in Europe, though there is significant regional variability in prices.

According to the EU Natural Gas Directive, passed in June 1998, member states must open their natural gas markets to competition. The Italian government unveiled plans for its liberalization process in May 2000, when the government directed that no single company can supply more than 50% of the natural gas sold to final users by 2003. No company will be able to send more than 75% of natural gas put into the transmission system beginning in 2002, and this will be reduced to 61% by 2009. The legislation also requires corporate and accounting separation of natural gas storage and transport activities. Snam will retain control of Italy's 30,000-kilometer (almost 19,000-mile) pipeline natural gas grid, but parent company Eni

must split Snam's pipeline transport activities from commercial and sales activities. In late November 2001, the new company controlling the natural gas grid, Snam Rete Gas Italia, had an initial public offering (IPO) of 35% of its shares, which was heavily oversubscribed. The launching of Eni's new gas distribution company, Italgas Piu, was also in November 2001. Through Stoccaggi Gas Italia, Eni also operates a system where it stores and modulates natural gas. Eni's storage system is made up by 9 fields, 8 of which are located in Northern Italy (one of them is not yet operational) and one in Central Italy. Enel received permission from antitrust authorities to acquire five gas distribution companies in Nothern Italy in October 2001. They are: Arda Gas, Gead, Adda Gas, Geico, and Sein.

Imports

Most of Italy's natural gasfields are located in the Po Valley and offshore in the Adriatic. Preliminary estimates of 2000 production show a 4% decline compared to 1999. Hence, Italy is growing increasingly dependent on imports. Diversification of supply is an important issue, as Italy relies heavily on Algeria and Russia. In 2000, Italian natural gas sources were estimated to be 21% domestic, 34% Algerian, 30% Russian, and 9% Dutch -- Algerian figure includes liquefied natural gas (LNG) imported from Algeria. Snam imports from the Netherlands, Algeria, and Russia, Edison imports from Russian and Algeria, and Enel imports from Algeria and Nigeria. Snam, Edison, and Enel have contracts in place to increase purchases of Algerian and Russian natural gas.

Libya, Norway, and Qatar (LNG) are major alternative suppliers for Italian gas. The biggest project under consideration is the proposed construction of a pipeline to link Libya and Italy's southern island, Sicily. This $5.5 billion "West Libya Gas Project" was finalized in July 1999 as a joint venture between Libya's state-held National Oil Company and Eni, and an Eni contract to buy 141 Bcf per year from the joint venture was signed in early 2000. In November 2000, Gaz de France agreed to buy another 70.6 Bcf from Eni. The 600-kilometer (372-mile) pipeline "Green Stream" will run under the Mediterranean and connect with the TransMed pipeline. About 282.5 Bcf will be able to flow through the pipeline. Engineering work on the pipeline has begun. Start-up is planned for 2004. Snam began importing 6 billion cubic meters per year (212 Bcf) of Norwegian natural gas through existing pipelines in October 2001, and will continue to do so for 24 years.

Liquefied Natural Gas

LNG is becoming increasingly important in Italy. Italy receives Algerian LNG at its Panigaglia terminal near La Spezia, under a 25-year contract that runs until 2015. ENEL also signed a contract in 1992 under which Nigerian LNG will be delivered to France and swapped out to ENEL for 22 years, beginning in 1999. In June 2001, Edison signed an agreement to buy 3.5 tons of LNG per year (equivalent to 173 Bcf) from the fourth natural gas train of Rasgas in Qatar when the train is completed in 2005. Delivery will be made to a $430-million floating regasification terminal to be constructed by Edison and ExxonMobil 11 miles offshore Marina di Rovigo in the northern Adriatic. Enel has announced that it also has an agreement with Qatar and Repsol-YPF to import LNG, but exact volumes have not yet been determined. Enel is requesting clearance to build new LNG terminals at three different sites in the hopes that two will be approved.

COAL

Coal consumption in Italy is dominated by power generation, which is increasing, and coke production for steel, which is decreasing. Coal has played a small role in the Italian energy sector, and Italy produces almost no coal domestically. In 1999, less than 6% of Italy's primary energy demand was met with coal. The power sector is expected to increase its coal consumption in coming years, as Eni works to decrease reliance on imported oil, though coal will not be as important as natural gas. Clean coal technology will figure prominently in this increased coal usage, as EU environmental stipulations, Kyoto targets, and Italian public opinion demand that Italy's energy sector become increasingly clean. Italy's Vado Ligure power plant uses coal-over-coal reburn technology that substantially reduces harmful emissions.

Increased coal usage will be supplied by a combination of increased domestic production and increased imports. Main exporters of steam coal to Italy are South Africa, Indonesia, Colombia, and Australia.

ELECTRICITY

Italy has electric generation capacity of 65.5 million kilowatts, and in 1999 the country generated 247.7 billion kilowatt hours (bkwh) and consumed 272.4 bkwh. Generation is mostly from thermal sources, although the mix of thermal power is shifting away from oil and toward natural gas, and to a smaller extent toward coal, such that natural gas should be the dominant fuel source for electricity generation by the end of the decade. Non-hydro renewable electricity generation (mostly solar and geothermal) almost doubled in the 1990s, and over 2% of Italian electricity is now produced from renewable sources.

Italy's extensive electricity network is linked to its neighbors. Electricity imports come mostly from France and Switzerland. Construction of a new 164-kilometer (102-mile), 400-kilovolt underwater cable to link Italy and Greece was completed in March 2001, and is in the process of becoming operational.

Sector Organization

Enel is Italy's dominant electricity company. Enel, which was 100% owned by the Italian government until November 1999, produced about 70% of Italy's electricity usage in 2000. Enel is by some measures the largest publicly listed electricity company in the world. EU directives require member countries to open their electricity markets to competition and also require that no single company generate more than 50% of any member country's electricity by 2003. This has led to several important changes in Enel, Italy's former electricity monopolity, including partial privatization and the sale of some of its assets to reduce market share. The November 1999 Enel privatization stock sale was Europe's largest initial public offering (IPO). The government floated 32% of the company, which sold for 18 billion euros ($15 billion), on the Milan and New York stock exchanges. The government has been discussing plans to sell off an additional tranche in 2002. Before further privatization, Enel may sell off the main Italian electricity grid to the operator GRTN, as this will be easier to do while the government still has a majority share.

Also in late 1999, the company spun off three separate and independent generating companies in preparation for their eventual sale, totaling 15,000 megawatts (MW) of generation capacity: Eurogen, the largest company, is based in Rome and Milan; Elettrogen the second largest, is based in Rome and Piacenza; the smallest company, Interpower, is based in Naples and Rome. Elettrogen was sold to Endesa of Spain for 7.15 trillion lira in the summer of 2001. Eurogen was put up for sale in September 2001, and expectations are that it will be sold for about 8.4 trillion lira. No company will be allowed to acquire or hold stakes in more than one of the three companies, and no buyer will be able to be more than 30% government-held. This last requirement was to prevent Electricite de France (EdF) from acquiring these companies. EdF has been the subject of a dispute between Italy and the European Union. Because liberalization of the energy sector has proceeded at a slower pace in France, EdF has remained a state-owned company. EdF's purchase of privatized assets would in effect transfer them from Italy to France, so Italy has restricted such sales. The European Commission ruled in June 2001, that capital flows may not be restricted merely because of varying degrees of liberalization. However, the initial privatization sale may be restricted, but such restrictions can only be in place for a limited period, after which the privatized companies can be resold to state-owned companies. Previously, EdF had already acquired a 20% share of Montedison, parent company of Italy's largest IPP Edison, though this is under investigation by Italian regulatory authorities. EdF and Fiat formed a consortium called Italenergia that received permission from the EU antitrust authority to take over Montedison in August 2001. Italenergia has a 96.9% stake in Montedison and a 95.7% stake in Montedison's energy subsidiary Edison. In order to reduce its $11.9-billion debt, Italenergia unveiled a plan in October 2001 to sell the seven non-energy companies and merge the group's three energy companies with Italenergia into a new company called Edison. Edison intends to bid for power stations to be sold by Enel. Edison is Italy's second-largest electricity provider.

Another facet of liberalization is that Enel must also sell its distribution networks in Italy's large urban centers. It has already sold off many of these local grids, including the Rome network to ACEA for 568 million euros in April 2001 and the Turin network to AEM for 480 billion lira. However, local electricity companies have complained that Enel is blocking some of their access and there are several lawsuits in this regard.

In early November 2000, the European Commission approved a merger that gives Italian conglomerate

Compart SpA sole control of Falck SpA, forming the then third-largest electricity generation company in Italy. The deal also gives Compart control of Falck's subsidiary, Sondel SpA. Enel, while selling off domestic assets, has made some foreign acquisitions. In December 2000, Enel purchased CHI Energy of the United States for $170 million. In September 2001, Enel purchased Nueva Viesgo of Spain, making Enel the fifth-largest generator in Spain. Siemens and Fiat Engineering are to build a power plant in Torino worth 190 million euros. It will be a combined cycle cogeneration plant for electricity and steam with a generating capacity of 390MW. Construction is due to start in Autumn 2002 with the plant entering service in 2005.

Nuclear

Italy has four nuclear power plants, all owned by ENEL. None is in operation. In 1987, a public vote decided against the use of nuclear power. The plants have remained idle since that time, and no nuclear generation is expected in the foreseeable future. Italy has a policy leaving spent fuel to cool down for decades on site before consigning it to a permanent deep-storage center.

ENVIRONMENT

Environmental awareness has grown in Italy in recent years. Although Italy has relatively low per capita energy consumption and energy intensity levels in comparison to other OECD countries, air pollution remains a serious environmental challenge.

Because of Italy's heavy reliance on oil imports to meet its energy needs, energy security and diversification of energy sources are a top priority in Italy's energy strategy. Italy is well endowed with renewable energy resources, such as solar, biomass and geothermal, that could be captured and utilized for energy. The government's goal of doubling the country's production of energy from renewable resources by 2012 will help enable Italy to meet its growing energy demand in the 21st century in a more sustainable manner.

COUNTRY PROFILE

President: Carlo Ciampi (since 1999)
Prime Minister: Silvio Berlusconi (since June 2001)
Location/Size: Southern Europe/301,230 sq km (186,763 sq mi, slightly larger than Arizona)
Major Cities: Rome (capital), Milan, Naples, Turin, Palermo, Genoa
Languages: Italian, German (parts of Trentino-Alto Adige region are predominantly German speaking), French (small French-speaking minority in Valle d'Aosta region), Slovene (Slovene-speaking minority in the Trieste-Gorizia area)
Ethnic groups: Italian (includes small clusters of German-, French-, and Slovene-Italians in the north and Albanian-Italians and Greek-Italians in the south)
Religion: predominately Roman Catholic with mature Protestant and Jewish communities and a growing Muslim immigrant community
Population (2001E): 57.7 million
Defense (8/98): Army, 165,600; Navy, 40,000; Air Force, 63,600; Paramilitary forces, 255,700; Conscripts, 134,100

ECONOMIC OVERVIEW

Minister of Economy and Finance: Giulio Tremonti
Currency: Lira (L)
Market Exchange Rate (12/18/01): US$1=2146.5 Italian Lira
Nominal Gross Domestic Product (GDP, 2000E): $1,077 billion **(2001F):** $1,093 billion
Real GDP Growth Rate (2000E): 2.9%; **(2001F):** 1.5%
Unemployment Rate (2000E): 10.7%; **(2001F):** 10.3%
Inflation Rate (consumer prices, 2000E): 2.0%; **(2001F):** 1.8%
Major Export Products: Textiles, clothing, machinery, transportation equipment
Major Import Products: Crude oil, other fuels, machinery, transport equipment
Major Trading Partners: Germany, France, Netherlands, U.S., United Kingdom

ENERGY OVERVIEW

Minister of Productive Activities: Antonio Marzano
Proven Oil Reserves (1/1/01E): 622 million barrels
Oil Production (2000E): 145,000 barrels per day (bbl/d), of which 78,000 bbl/d is crude oil
Oil Consumption (2000E): 1.9 million bbl/d
Net Oil Imports (2000E): 1.8 million bbl/d
Crude Oil Refining Capacity (1/1/01): 2.36 million bbl/d
Natural Gas Reserves (1/1/01E): 8.1 trillion cubic feet (Tcf)
Natural Gas Production (1999E): 618 billion cubic feet
Natural Gas Consumption (1999E): 2.4 Tcf
Net Natural Gas Imports (1999E): 1.8 Tcf
Recoverable Coal Reserves (1997): 37 million short tons (Mmst)
Coal Production (1999E): 0.02 Mmst
Coal Consumption (1999E): 19.2 Mmst
Electric Generation Capacity (1999E): 65.5 million kilowatts
Electricity Generation (1999E): 247.7 billion kilowatthours
Electricity Consumption (1999E): 272.4 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Minister of Environment: Altero Matteoli
Total Energy Consumption (1999E): 8.0 quadrillion Btu* (2.1% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 121.3 million metric tons of carbon (2.0% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 139.7 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.1 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 6,457 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.09 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (44.1%), Transportation (25.7%), Residential (23.6%), Commercial (6.6%)
Sectoral Share of Carbon Emissions (1998E): Industrial (41.2%), Transportation (29.8%), Residential (22.7%), Commercial (6.3%)
Fuel Share of Energy Consumption (1999E): Oil (51.1%), Natural Gas (30.5%), Coal (5.7%)
Fuel Share of Carbon Emissions (1999E): Oil (61.3%), Natural Gas (29.1%), Coal (9.6%)
Renewable Energy Consumption (1998E): 560 trillion Btu* (1% increase from 1997)
Number of People per Motor Vehicle (1998): 1.7 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified April 15th, 1994). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, but not yet ratified), Italy, as a member of the European Union, has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: Air pollution from industrial emissions such as sulfur dioxide; coastal and inland rivers polluted from industrial and agricultural effluents; acid rain damaging lakes; inadequate industrial waste treatment and disposal facilities.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral

shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

ENERGY INDUSTRY

Oil and Gas Company: Ente Nazionale Idrocarburi (ENI); Chief Subsidiaries: Agip (hydrocarbons exploration and production), Snam (gas supplies and hydrocarbon transportation), ENIchem (petrochemicals)
Major Pipelines (gas): TransMed, Trans-Austria Gasleitung
Major Ports: Cagliari (Sardinia), Genoa, La Spezia, Livorno, Naples, Palermo, Trieste, Venice
National Electricity Company: Ente Nazionale per l'Energia Elettrica (ENEL, undergoing privatization)

Sources for this report include: CIA World Factbook; Dow Jones; Economist; Economist Intelligence Unit; ENEL; ENI; European Union; Financial Times; La Stampa; Petroleum Economist; U.S. Commerce Department; U.S. Energy Information Administration; U.S. State Department; WEFA; World Gas Intelligence.

Links

For more information from EIA on Italy, please see:
Latest EIA Detailed Annual Data
EIA Privatization Report (oil) - Italy
EIA Privatization Report - Italy

Links to other U.S. Government sites:
CIA World Factbook, Italy
U.S. Department of Energy's Pacific Northwest Laboratories, Energy Trends, Italy
U.S. State Department's Report on Economic Policy and Trade Practices, Italy
U.S. State Department's Country Commercial Guide, Italy
U.S. State Department's Background Notes, Italy
U.S. State Department's Consular Information Sheet, Italy
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ENI Home Page (in English)
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May 2002

Background | Oil | Natural Gas | Coal | Electricity | Profile | Links

Portugal

Portugal's energy imports are expected to increase significantly as the country has little potential for increasing energy production from domestic resources. Portugal's energy sector is becoming increasingly integrated with Spain's.

Note: The information contained in this report is the best available as of May 2002 and is subject to change.

BACKGROUND

Portugal is the smaller nation of the Iberian peninsula, with about a quarter of the population of neighboring Spain. Portugal is a member of the European Union (EU) and the common European currency, the euro. Portugal is relatively poor and receives net transfers from the EU. However, it has grown quickly since joining the EU, with the gap between Portuguese and EU average GDP per capita closing from the EU average being 47% higher in 1986 to 27% higher in 2000. Several years of real economic growth above 3% came to an end in 2001. In that year, weak private consumption and a slowdown in export growth resulted in economic growth of 1.7%. Economic conditions are expected to stay at this lower growth level in 2002.

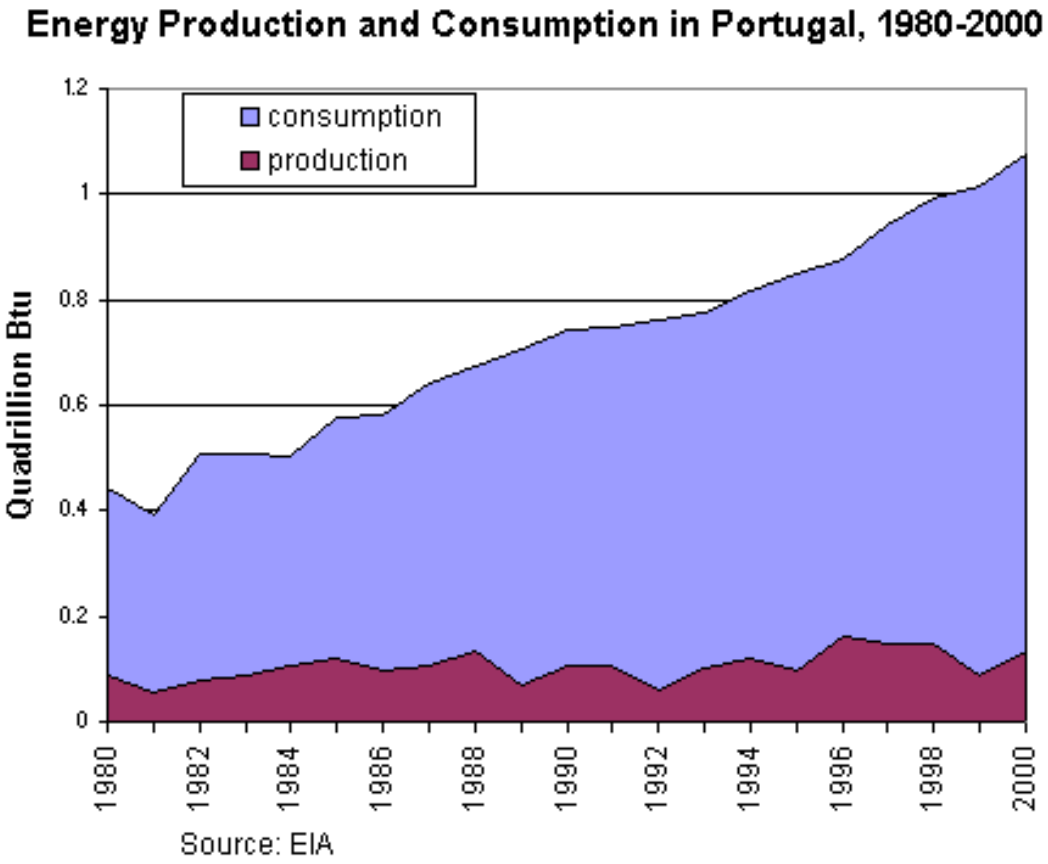
In February 2002, Portugal received a formal reprimand from the European Commission (EC) for the size of the country's budget deficit, projected by the EC to be 2.6% in 2002. Portugal's newly-elected prime minister, José Manuel Durão Barroso of the center-right Social Democratic Party (PSD), has responded by presenting a program of sharp budget cuts and an increase in the value added tax rate to bring the deficit under control. The budget deficit issue, however, has delayed the new government's plans to cut the corporate tax rate and the highest income tax bracket rate. Despite lower economic growth and budgetary problems, the unemployment rate remained low, at just 4.1% at the end of 2001.

Portugal has extremely limited domestic energy resources and imports about 90% of its energy needs. Domestic coal production ceased in 1996, but at the same time, domestic natural gas exploration began. Because of Portugal's

geographic location, bordering only Spain and the Atlantic Ocean, much of its energy imports are transported through Spain. Capsa of Spain and Galp announced in March 2002 that they will collaborate on fuel transport in order to cut costs. The Iberian peninsula has an extensive natural gas network that links the two countries and Algeria via Morocco. The two Iberian countries signed an agreement in November 2001 to completely integrate their electricity markets by 2003. In June 2001, Portugal approved 1 billion euros in new government-financed energy projects.

OIL

Portugal consumed 339,000 barrels per day (bbl/d) in 2001. Over 25% is used for electricity generation, as coal and natural gas use is lower than in most EU countries. In 2000, oil made up 64% of total Portuguese primary energy consumption.



Privatization in the Portuguese oil sector (nationalized in 1975) began in 1992, but the state retains its controlling share in Petroleos de Portugal (Petrogal), the country's state oil company and part of the larger Galp conglomerate. The Galp conglomerate was formed along the same pattern as Spain's Repsol/Gas Natural Group, and it includes Petrogal, Transgas, and Gas de Portugal. In 2000, Petrocontrol (which also owns 45% of Petrogal) sold off two-thirds of its share in Galp to the Italian energy conglomerate Eni, and its remaining third to Electricidade de Portugal. Eni also bought 11% of Galp from the state. With Iberdrola (a Spanish utility) purchasing an additional 4%, state ownership of Galp shrunk to 34.81% with

the completion of all acquisition procedures in July 2000. An initial public offering (IPO) of a further 20% of Galp by the state has been postponed until the second half of 2002 or 2003 because of prevailing weak conditions in international stock markets.

Portugal has almost no domestic petroleum resources, as exploration on the continental shelf in the 1970s discovered no commercially viable reserves. Houston-based independent Mohave Oil and Gas, however, plans to drill onshore in the Lusitanian basin area, north of Lisbon. Swedish independent Taurus Petroleum is hopeful that it will find commercially viable oil reserves in the Galician area, offshore, near the Spanish border, but so far there is no production. TGS-NOPEC Geophysical Company ASA has been conducting offshore seismic tests in deepwater beyond the continental shelf and has encountered source-rock structures that show good hydrocarbon potential. Portugal will have a formal licensing round that will run from July to November of this year for offshore blocks in the deepwater area beyond the continental shelf. Assuming that the license round is successful, exploratory drilling is expected to commence within about three years.

Galp/Petrogal is active in exploration and production abroad. It produces in Spain and Angola, a major oil producing country. In Angola, in addition to its offshore well in Block 14 (9% share, 100,000 bbl/d expected before the end of 2002), Petrogal has bid on Blocks 31, 32, and 33 and is leading the charge for a share of Block 34. However, its shared Block 1 well is in decline and onshore Cabinda production has been halted due to political instability. Petrogal won two exploration licenses in Brazil in June 2000 and acquired 2 more oil exploration licences in June 2001. All are in conjunction with Petrobras. Petrogal announced in November 2001 that the company will not make any further investments in oil exploration and production in Brazil. Rather, the company will focus on the developing a significant downstream presence in Spain, where it now has a 2% market share.

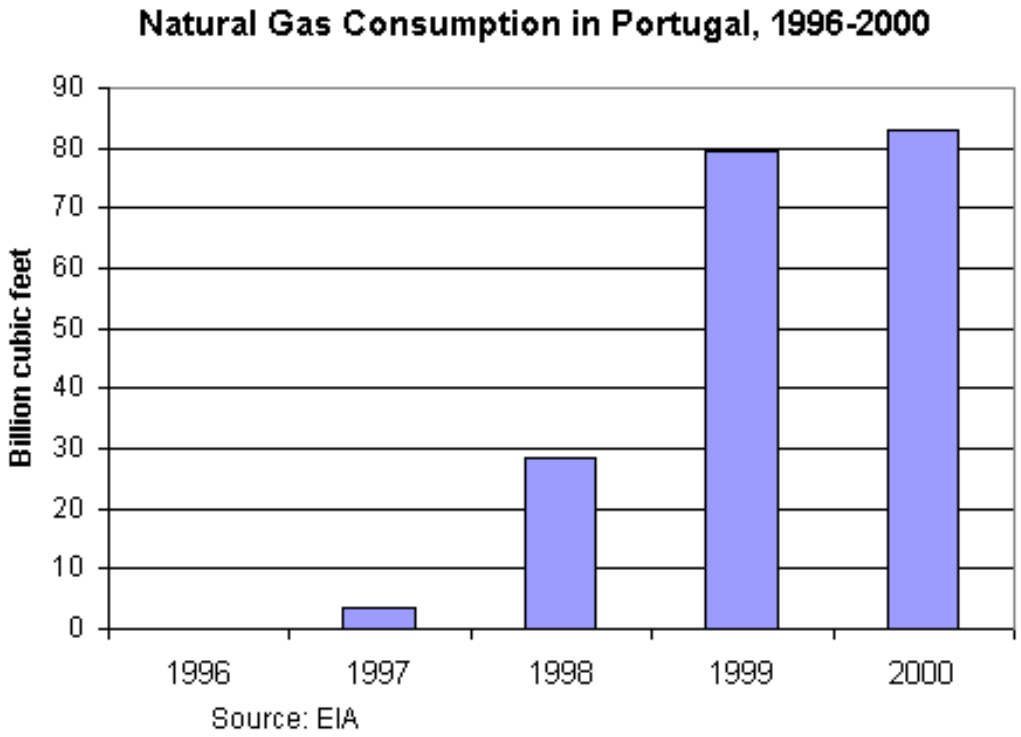
Refining/Downstream

Portuguese refineries include Sines and Oporto operated by Petrogal. The

Sines Refinery has a pipeline to Lisbon by way of Aveiras. In January 2002, Portugal began complying with the EU's standards for sulfur content in fuels that are part of the EU's Auto-Oil program for reducing harmful emissions. Price ceilings are still maintained on gasoline and automotive diesel fuel.

NATURAL GAS

The Portuguese natural gas sector is young and growing rapidly. Annual consumption was nearly non-existent prior to 1997, but reached 80 billion cubic feet (Bcf) in 1999, leveling off to 83 Bcf in 2000. Prior to 1997, there was some consumption of town gas (a non-methane gaseous hydrocarbon usually produced from chemical processes acting upon other hydrocarbons, often naphthas) in Lisbon; this system is being converted to use natural gas. The demand for liquefied petroleum gas (propane) is falling because of competition from natural gas. However, most natural gas is still used for electricity generation. The country began natural gas consumption after the Maghreb-Europe pipeline connected the Iberian peninsula to Algerian gas sources (via Morocco) in 1996. Transgas (95.4% owned by Gas de Portugal) spent $35 million to create a link allowing Portugal to import Algerian gas through Spain. Gas de Portugal owns the entire Portuguese section, and part of other sections. Portugal (with EU assistance) is making large investments in its gas infrastructure, having spent approximately 485 million euros on this between 1994 and 1999. Since 1999, the government has curtailed this spending somewhat, but there are still plans to expand the gas network from 3,761 miles in 1999 to 5,943 miles in 2010.



The Portuguese gas sector is part of Galp, as noted above, with the government a 34.81% stakeholder. Transgas, a subsidiary of Gas de Portugal, is the network operator. The various regional distributors are owned by Gas de Portugal (largest stakeholder) and Petrogal (second largest stakeholder), so that Galp effectively controls the entire system, with the exception of the distributor Setgas, of which Galp is a minority stakeholder. Under an EU directive, member states must open up at least 28% of their market to competition by 2003.

Mohave Oil and Gas Company and Desire Petroleum PLC, made Portugal's first significant natural gas discovery at Alijubarrota. However, in June 2001 Desire Petroleum plugged the Alijubarrota 2 side track gas well because, according to the company, the zone had "failed to produce commercial quantities of hydrocarbon gases during underbalanced drilling operations."

Liquefied Natural Gas (LNG)

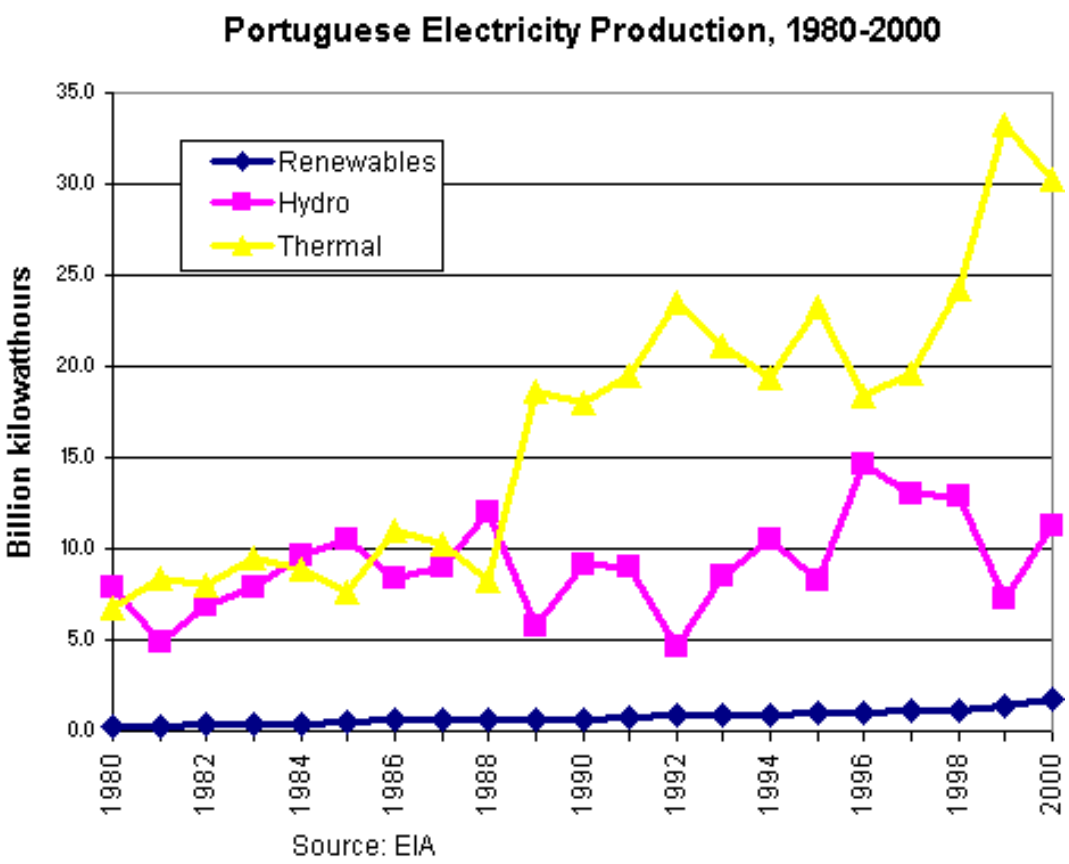
Portugal became an LNG purchaser for the first time in 1998. Another contract was signed in 1999, under which Portugal will buy larger amounts of Nigerian LNG for 20 years, with delivery beginning in 2002. Portugal does not have an LNG regasification terminal but has begun steps to build one at Sines by 2004. Until that time, LNG will be regasified in Spain and piped into Portugal.

COAL

Portugal has not produced coal since its last mine closed in 1994. It does import relatively small amounts of coal for electricity generation, especially in periods of decreased hydropower. Although hydropower increased in 2000, annual coal consumption fell only slightly in 2000 as electricity demand increased overall.

ELECTRICITY

Hydropower accounted for about 26% of Portugal's total electricity generation in 2000, a substantial increase from 17% in 1999, a year characterized by particularly dry weather. Likewise, Portugal's oil and coal consumption for power generation fell in 2000 to about 70% from 79%; one can see from the graph that thermal and hydropower have an inverse relationship in Portugal. During the 1990s, installed capacity for hydropower has grown while installed capacity for thermal power has decreased slightly, and hydropower now exceeds oil generated power (the largest thermal source) in terms of installed capacity. The Portuguese electricity grid is connected with Spain's and consists of 44,127 miles of high/medium voltage transmission lines and 69,640 miles of low voltage transmission lines. Up to 10% of demand could potentially be imported from and/or through Spain (and vice-versa). Portugal generated 2.14 billion kilowatthours (Bkwh) more electricity than it consumed in 2000. Despite rapidly increasing energy consumption (6% per year average 1973-1998), Portugal still has the lowest per capita power consumption in the EU.



Spain and Portugal signed an agreement in November 2001 that calls for their electricity markets to be completely integrated by January 2003. This means that there will be a single market operator to negotiate the sale of electricity, a merger of logistics networks, and increased interconnection of the countries' grids. In addition, all companies will operate under the same competition guidelines, and tariffs will be harmonized. In January 2002, a report was issued by the two countries' regulators that outlines substantial challenges in implementing the project, including a small number of companies having most of the market share; little separation between monopoly transport and distribution activities and competitive production and marketing activities; and the different ways in which electricity enters the market. The Portuguese system is outlined below; in Spain producers compete to sell their electricity, but receive compensation payments for market liberalization called CTCs.

Since 1993 there have been independent power producers in Portugal, and by 1998 they accounted for 28% of the country's power production. There are two electricity systems in Portugal, the Public and the Independent. The Public system is heavily regulated to ensure a guaranteed supply. In the Independent system, competition has been introduced (in line with EU directives), but is an option only for large consumers of electricity (about

20,000 customers with annual consumption of over 9 gigawatthours (Gwh) - some 10% of the market. In the Public system, the 70%-state-owned/30%-EDP-owned grid operator REN has exclusive and obligatory contracts with suppliers at a price expected to cover costs. In the Independent system there are no power purchase agreements; consumers can choose their supplier, though the REN transmission system is still used. Erse is the Portuguese independent electricity regulator. Since January 2002, the government no longer has any power over electricity tariffs. Rather, Erse makes the final decision after receiving a recommendation from a council equally composed of consumer groups and the electricity companies.

Electricidade de Portugal (EDP) is Portugal's largest electricity company. EDP has been progressively privatized in recent years, with a further 18% sold off in October 2000. This has reduced the government's stake to just 32.6%, although the state retains "golden share" rights that give it effective veto power. The signing of the unification agreement in November 2001 spurred a number of deals in the Iberian countries' electricity sectors. In December 2001, EDP acquired a 40% share of the holding company that owns 95% of Spanish utility Hidrocantabrico. Spanish approval of this deal was seen as contingent on unification of the Iberian electricity markets. EDP, as the senior partner, will take control of Hidrocantabrico's operations, giving the Portuguese company a large foothold in the Spanish market. Also in December 2001, EDP decided to dispose of its 3% share of Iberdrola, severing ties with this other large Spanish utility that had at one point been looking to merge with EDP. In that same month, Spain's largest utility, Endesa, made plans to gain a share of Portugal's electricity market with the launch of a 50:50 joint venture with Portuguese industrial holding company Sonae. The new company, to be called Endesa Energia Portugal, aims to achieve a 15% share of the large consumer market. Endesa already has a share of one of Portugal's largest coal-fired generating plants.

Siemens has an order to construct a 780-megawatt (MW) natural-gas-fired power plant outside of Lisbon for EDP by sometime in 2004. There is an option to build an additional 380-MW facility at the same site. With rising

electricity demand and large-scale hydroelectric power already maximized, Portugal will have to build more thermal plants, increase imports, or rely more on renewable sources of electricity such as wind, solar, co-generation, and mini-hydroelectric plants. The Portuguese government aims to increase electricity generation from renewable sources by 40% during the period 2002-2010. Portugal produced 1.8 Bkwh from renewable sources (excluding hydro) in 2000.

The Portuguese government owns 81.66% of the Cahora Bassa Hydroelectric Dam in Mozambique, with the Mozambican government owning the remainder. Portugal has a dispute with South Africa over payment for electricity generated by the dam. Portugal wants payment in U.S. dollars instead of rand, complaining that South Africa is reselling the power in dollars, (which have appreciated 40% against the rand in 2001) and thereby transfering profits from the dam in Mozambique to South Africa. EDP is active in Latin America, especially in Brazil, where the company already owns large shares of several companies and has plans to invest nearly $1 billion in the next three years.

Nuclear Power

Portugal has no nuclear power plants. While there has been some interest and discussion regarding the construction of a nuclear plant, there has been no action toward this end.

COUNTRY OVERVIEW

Head of State: President Jorge Sampaio (since 1996; re-elected in 2001)
Prime Minister: José Manuel Durão Barroso (elected March 2002)
Independence: 1143; from Spain 1640 (republic proclaimed October 5, 1910)
Capital City: Lisbon
Population (2001): 10.1 million
Location/Size: Southwestern Europe, bordering the North Atlantic Ocean, west of Spain/92,391 sq km (slightly smaller than Indiana)
Language: Portuguese

Religion: Roman Catholic 97%, Protestant denominations 1%, other 2%

ECONOMIC OVERVIEW

Finance Minister: Maria Manuela Dias Ferreira Leite
Currency: Euro
Exchange Rate (May 22, 2002): 1 US Dollar = 1.08 Euros
Gross Domestic Product (GDP, nominal, 2001): $108.6 billion
Real GDP Growth Rate (2001E): 1.7% **(2002F):** 1.2%
Inflation Rate (consumer prices, 2001): 4.4% **(2001F):** 2.6%
Unemployment Rate (2001, fourth quarter): 4.1%
Merchandise Exports (2001E): $26 billion
Merchandise Imports (2001E): $38 billion
Major Trading Partners: Germany, Spain, France, United Kingdom
Major Export Products: textiles, footwear, leather goods, machinery and transport equipment, wood and cork, agricultural goods and foodstuffs
Major Import Products: Machinery and appliances, agricultural products and byproducts, chemical and plastic products, land transport equipment, mineral products

ENERGY OVERVIEW

Minister of the Economy: Carlos Manuel Tavares da Silva
Secretary of State for Trade, Industry and Services: Rosário Ventura
Oil Production (2001E): 2,000 barrels per day (bbl/d) (refinery gain)
Oil Consumption (2001E): 339,000 (bbl/d)
Crude Oil Refining Capacity (1/1/2002): 304,172 bbl/d
Natural Gas Consumption (2000E): 83 billion cubic feet
Coal Reserves (12/31/96): 40 million short tons (Mmst)(no longer mined)
Coal Consumption (2000E): 6.67 Mmst
Electric Generation Capacity (2000E): 11 gigawatts
Electricity Generation (2000E): 43.24 billion kilowatthours (thermal 70%; hydro 26%; biomass, geothermal, solar, and wind 4%)

ENVIRONMENTAL OVERVIEW

Minister for Towns, Territorial Planning and Environment: Isaltino Afonso de Morais
Total Energy Consumption (2000E): 1.1 quadrillion Btu* (0.3% of world total energy consumption)
Energy-Related Carbon Emissions (2000E): 16.73 million metric tons of carbon (0.3% of world total carbon emissions)
Per Capita Energy Consumption (2000E): 108.9 million Btu (vs. U.S. value of 348.9 million Btu)
Per Capita Carbon Emissions (2000E): 1.7 metric tons of carbon (vs. U.S. value of 5.7 metric tons of carbon)
Energy Intensity (2000E): 11,681 Btu/$1995** (vs U.S. value of 10,919 Btu/$1995)
Carbon Intensity (2000E): 0.13 metric tons of carbon/thousand $1995** (vs. U.S. value of 0.17 metric tons/thousand $1995)
Sectoral Share of Energy Consumption (1998E): Industrial (48.3%), Transportation (26.1%), Residential (14.1%), Commercial (11.5%)
Sectoral Share of Carbon Emissions (1998E): Industrial (43.7%), Transportation (33.3%), Residential (12.3%), Commercial (10.7%)
Fuel Share of Energy Consumption (2000E): Oil (63.8%), Coal (14.8%), Natural Gas (8.3%) Hydro (11%) Other renewable (1.8%)
Fuel Share of Carbon Emissions (2000E): Oil (68.6%), Coal (23.7%), Natural Gas (7.7%)
Renewable Energy Consumption (1998E): 185 trillion Btu*
Number of People per Motor Vehicle (1998): 2.9 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 21st, 1993). Signatory to the Kyoto Protocol (signed April 29th, 1998 - not yet ratified).
Major Environmental Issues: Soil erosion; air pollution caused by industrial and vehicle emissions and water pollution (especially in coastal areas).
Major International Environmental Agreements: A party to Conventions on Air Pollution, Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life

Conservation, Ozone Layer Protection, Ship Pollution, Tropical Timber 83 and Wetlands. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Air Pollution-Volatile Organic Compounds, Climate Change-Kyoto Protocol, Environmental Modification, Nuclear Test Ban, Tropical Timber 94.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 2000

Sources for this report include: BBC Worldwide Monitoring; CIA World Factbook; Diario de Noticias; DRI/WEFA; Economist; Economist Intelligence Unit; Electricidade de Portugal; Europe Information Service; European Union; Financial Times; International Energy Agency; Petroleum Economist; Petrogal; U.S. Energy Information Administration.

LINKS

For more information from EIA on Portugal, please see:
Portugal Country Data

Links to other U.S. Government Sites:
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U.S. State Department Consular Information Sheet - Portugal
U.S. State Department Country Commercial Guide - Portugal
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January 2002

Spain

Spain is one of the fastest growing European economies but has very limited domestic energy resources. As a result, Spain is expected to become an increasingly important energy importer.

Note: The information contained in this report is the best available as of January 2002 and is subject to change.

BACKGROUND

Spain's period of rapid (4% annual growth) economic expansion is slowing. Still, Spain's forecast growth rate of 2.4% in 2002 is still well above the average "eurozone" growth rate forecast of 1.4%. The unemployment rate has decreased significantly (although projected at 12-13% for 2002), and government finances have improved over the past year. Inflation is expected to ease from 3.7% in 2001 to 2.4% in 2002 as unions have recently given priority to job creation over wage increases. Prime Minister Jose Maria Aznar's center-right Popular Party was re-elected with an absolute majority in March 2000. Aznar is continuing his liberalization of Spanish industry. Legislation aimed at getting rid of monopolies (state-held or private) in the energy, telecommunications, and services industries passed in June 2000. Oil, natural gas, and electricity markets are key targets in Aznar's liberalization program.

The recent economic and political turmoil experienced by Argentina has adversely affected Spanish companies, which invested EUR 45 billion there over the last decade. Five large Spanish companies, including oil company Repsol-YPF and power company ENDESA, that alone account for about three-

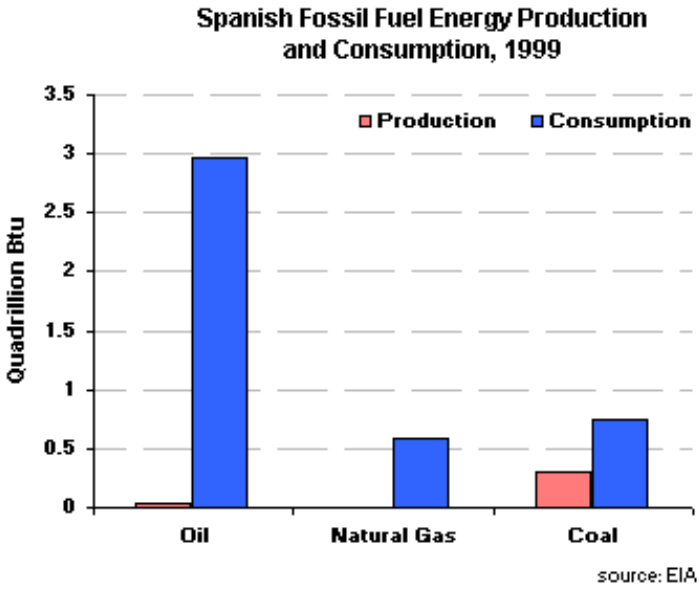
quarters of the trading volume on the Madrid stock exchange, are expected to lose billions of euros because of the default on Argentine government debt and the devaluation of the Argentine peso.

Spain's economic growth and accelerated industrialization associated with European Union (EU) membership have fueled energy demand, up 75% since the mid-1970s. Electricity demand is growing at a particularly rapid rate of 6% per year, reflecting a need for greater investment. Spain is highly dependent on imported oil, leaving the country economically vulnerable to world oil price fluctuations. Further energy demand increases are expected to be met largely with natural gas imports. The increasing use of natural gas has created a new dependency on Algeria, from which Spain obtains 60% of its natural gas imports. With an extensive gas network now in place, Spain's demand for natural gas is expected to increase dramatically during the next few years.

Spain assumed the six-month European Union (EU) presidency in January 2002, and Spanish Finance Minister Rodrigo Rato has announced that Spain will seek to establish a link between progress on the liberalization of energy markets and energy tax harmonization during its term. In December 2001, government energy regulator CNE recommended a EUR 4 billion investment in Spain's natural gas and electricity sectors in order to guarantee supply, to be financed mostly by Red Electrica and Gas Natural's Enagas.

OIL

Oil plays a major (albeit decreasing) role in the Spanish energy sector. In the 1970s, oil accounted for 73% of Spain's primary energy consumption. That percentage has now fallen to less than 60% and is expected to fall further as natural gas becomes an increasingly important fuel source. In 2001, Spain consumed about 1.5 million barrels per day (bbl/d) of oil, 99% of which was imported.



Spain has very limited domestic oil reserves and production. The largest producing area is in the Mediterranean Sea, with the Casablanca complex producing about 4,000 bbl/d. In October 2001, Spain authorized Conoco's UK subsidiary to explore for hydrocarbons off the coast of the southern Mediterranean province of Malaga. The permit for exclusive exploration rights is for six years.

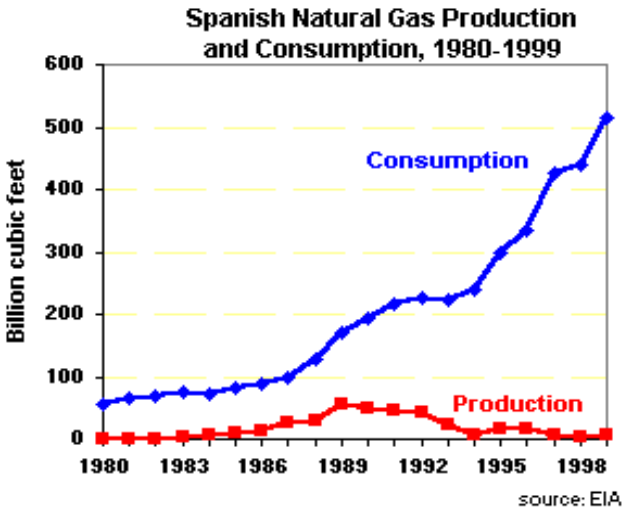
Until 1993, the Spanish oil industry was state-controlled. Today, formerly state-held (now private) Repsol still dominates the Spanish oil sector (and also the Spanish natural gas sector, through a controlling share in the Gas Natural Group). The company acquired the top Argentine oil company, YPF, in 1999, changing the company name to Repsol-YPF. Repsol-YPF is responsible for over 50% of Spain's oil production. Worldwide, the company has reserves of 4.8 billion barrels of oil equivalent and and a daily production of about 1 million barrels of oil equivalent per day. The company owns the majority of Spain's refineries, its distribution network (through Compania Logistica de Hidrocarburos, CLH, in which it holds a majority stake), and its gasoline stations (through its trademarks Repsol, Campsa, and Petronor). Divestments in the wake of the merger are working to lessen Repsol-YPF's control in the industry. June 2000 economic liberalization plans also work toward this end; the company's share in CLH must be reduced from 62% to 25%. Repsol-YPF's profits will be much lower for 2001 than the record $2.10-billion profit achieved in 2000 because of the Argentine economic situation. Repsol-YPF derives 45% of its operating income from Argentina's oil and natural gas fields, and is negotiating a "contribution" to Argentina's government expected to be between $300 million and $500 million.

Compania Espanola de Petroleos (Cepsa), established in 1929, is Spain's oldest private oil and gas company. The company has exploration and production activities in Colombia and Algeria. It is the second largest oil group in Spain, with a 25% retail market share. BP Oil is also active in Spain. Repsol, Cepsa, and BP Oil account for almost all of the activity in the Spanish oil sector.

Refining

Spain has nine major refineries. Four are owned by Repsol, and another is owned by a Repsol subsidiary, Petronor, in which Repsol has an 88% stake. Cepsa owns three, and one is owned by BP. Because of state regulation of the industry, Spain has avoided developing the excess refining capacity that characterizes some other countries in southern Europe. Spain's total crude oil refining capacity stands at 1.3 million bbl/d.

NATURAL GAS



Natural gas is expected to account for a much larger share of Spain's total energy consumption in coming years, especially as new pipelines and natural gas-fired power plants come on line. Natural gas consumption has grown from 2% of total energy consumption in the 1970s to more than 11% in 1999. Preliminary estimates of consumption for 2000 are about 611 billion cubic feet (Bcf). Some estimates predict natural gas consumption growing at a 15% annual rate in this decade. Spanish energy company Endesa predicts demand for natural gas rising to about 883 Bcf by 2005. Almost all of this consumption will be satisfied with imports, as Spain has extremely limited natural gas reserves. The country's largest natural gas field went out of production in 1995, and only a very small number of smaller fields remain in production.

The Gas Natural Group (GN) is the leading natural gas conglomerate in Spain, dominating Spain's gas sector with 90%-95% of the market. However, in the market for industrial customers, which was partially opened in 2000, GN's market share was down to 79% by the first half of 2001. Repsol-YPF controls the Group, with 47% of its shares and majority board representation. GN is comprised of Gas Natural SDG, the main natural gas distributor in Spain; Enagás, a transport company; Gas Natural Aprovisionamientos (supplies); Gas Natural Comercializadora (commercialization); Gas Natural Servicios, the services company of the Group; Gas Natural Overseas Trading Company; 14 natural gas distribution companies in Spain; and Gas Natural Internacional, which brings together in a single business unit the interests of GN in Gas Natural BAN (Argentina), Gas Natural ESP (Colombia), Companhia Distribuidora de Gas do Rio de Janeiro-CEG, CEG RIO and Gas Natural SPS (Brazil), in addition to Gas Natural México. Also, GN has minority holdings in three natural gas distribution companies in the region of Aragon and in the Basque Country.

According to liberalization legislation passed in June 2000, no single operator may command over 70% of the Spanish natural gas market by 2004. Since June 2000, large industrial consumers have been able to choose suppliers, and all consumers should be able to choose suppliers by 2003. Several additional regulatory measures were taken in 2001: In July, Spain's Economy Ministry published the terms under which GN must auction off one-third of its 580 Bcf per year Algerian pipeline natural gas imports. In September, Spain's Economy Ministry detailed new natural gas sector regulations that include a revised system for calculating pipeline tariffs and procedures for accessing the national grid. Finally, in October, the government ended GN's monopoly of natural gas imports when a contract for Algerian gas imports equivalent to about 25% of Spain's total annual consumption was awarded to Spain's four largest electricity companies (Endesa, Iberdrola, Union Fenosa, and Hidrocantabrico), BP, and Royal Dutch/Shell. This is part of a strategy being pursued by Spanish electricity companies to enter into the natural gas market. As Algeria supplies about 75% of Spain's imports, these companies now control about 19% of the market. These

companies have until 2004 to sell the natural gas to their industrial clients. The planned sale of 65% of GN subsidiary Enagas cannot be valued until the publication of new natural gas tariffs by the government, expected sometime in 2002.

The Group's Enagás transports natural gas imports to the Iberian Peninsula via gas pipelines connected to international networks (or via methane carriers for liquefied natural gas, discussed below). There are two international gas pipelines in Spain: Lacq-Calahorra in the north and the Pedro Duran Farell pipeline (formerly the Mahgreb-Europe line) in the south. The Lacq-Calahorra gas pipeline is the main Spanish connection to the European network, linking to Norway's North Sea gas sources. The Pedro Duran Farell pipeline, which crosses through Algeria and Morocco and travels under the Strait of Gibraltar, is about 870 miles (1,400 kilometers) long and connects the Algerian deposits with the Spanish gas pipeline network in Córdoba. This pipeline made its first Spanish delivery in 1996. Work is underway to expand the Pedro Duran Farell pipeline's annual capacity from 282.5 Bcf to 388.5 Bcf by adding a compressor station. Completion is expected in late 2003.

There are two new projects underway as well. Spain will have an additional connection with France via Irun in the Basque Country as a new transfrontier connector is being built with completion expected by the end of 2003. A further extension of the pipeline network coming to and from Irun is planned to be ready between 2005 and 2008. It will have 111 miles in Spain and 93 miles in France, and possess an annual capacity of 144.8 Bcf. In July 2001, Cepsa and Sonantrach of Algeria signed an agreement for the construction of the new Medgaz undersea natural gas pipeline between Algeria and Almeria, Spain, which received political backing in August. A feasibility study is scheduled to be completed in early 2003. The pipeline would have a length of 137 miles and have a capacity of between 282.5 Bcf and 353 Bcf. Natural gas would be alloted in proportion to each shareholder's equity ownership. At present, Sonatrach and Cepsa each hold 20%, while BP, Endesa, Eni, Gaz de France, and TotalFinaElf each hold 12%. Some natural gas from this pipeline may transit through Spain onto other European destinations.

Liquefied Natural Gas

Spain is Europe's second-largest liquefied natural gas (LNG) importer, behind France. Spain has three regasification terminals (Barcelona, Cartagena, and Huelva), the most of any country in Europe. All three are owned and operated by GN. Algeria is Spain's largest LNG supplier. Spain also is involved in long-haul LNG transit, importing LNG from the United Arab Emirates and Qatar. In 1999, Spain began receiving shipments from Trinidad and Tobago and Nigeria. In October 2000, shipments began from Oman, with 17 received through the end of January 2002. In June 2001, GN and Enel of Italy signed an agreement to develop joint marketing and sales negotiations for LNG internationally.

The GN plans to expand its three regasification terminals and its tanker fleet in order to handle increased LNG imports for rising domestic consumption. Spanish electricity generator Union Fenosa signed a firm contract with the Egyptian General Petroleum Corporation in July 2000 for the purchase of LNG from a new liquefaction terminal under construction at Damietta, Egypt. Union Fenosa and Iberdrola, which are constructing the new receiving gasification plant together, had disagreed on the location, but in November 2001 they settled on Fenosa's proposal at the Sagunto port in Valencia. The plant, to be completed in winter 2004, will be able to process 282.5 Bcf per year and will be linked to new combined cycle gas turbine plants being constructed by Fenosa nearby and Iberdrola in Castellon. Some of the natural gas will also transit to other locations.

A new regasification plant is planned for northern Spain. The Bahia de Bizkaia Gas group, a consortium led by BP and including Repsol-YPF, Iberdrola, and EVE (the Basque Energy Authority), will build the new import facility in conjunction with a new power station. The regasification facility is expected to begin operations in 2003.

Seven Spanish companies and Algeria's Sonatrach, forming the Reganosa group, will begin building in 2002 another new LNG import facility. Algerian LNG will supply the new Ferrol terminal in Galicia in northwest Spain for ten years following the terminal's projected 2004 commissioning. In conjunction with the terminal, which will have an initial capacity of 88 Bcf per year, a new pipeline will be constructed to

connect the terminal to power plants located about 60 miles away.

COAL

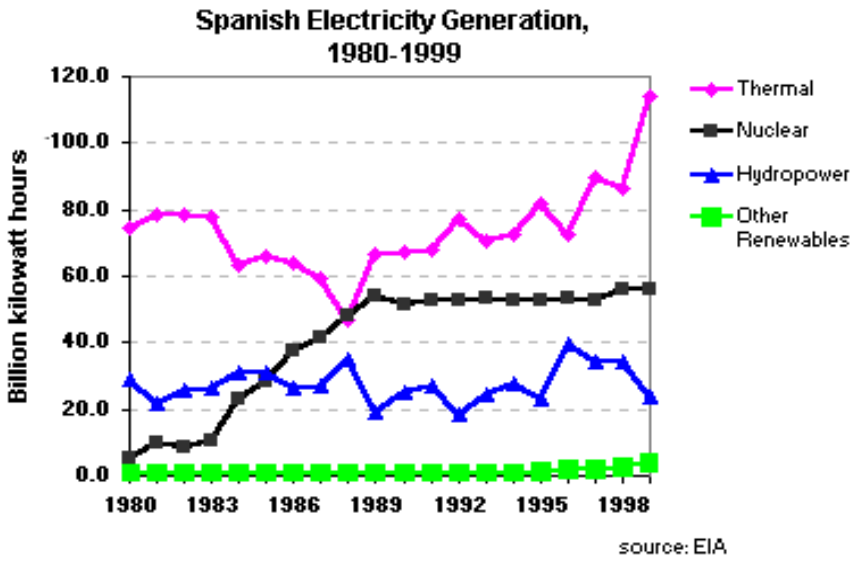
Coal is Spain's most plentiful indigenous energy source. Production has fallen in recent years, and the decline is expected to continue as Spain works to meet environmental standards. Currently, 95% of coal is used to generate electricity. All of the major coal companies are state-owned.

Spanish coal is too expensive to be competitive in a free energy market, with about 80% of the coal costing at least twice international prices to produce, so the Spanish government subsidizes coal production. According to new EU regulations that will take effect in July 2002, Spain must lower its coal production by 65% over the next ten years. Also, coal mines that do not improve their economic viability will only be able to receive production subsidies until 2008. Spain is one of three EU countries that will be permitted to continue coal production for reasons of economic security, and hence will continue to receive subsidies for more competitive mines. There is increased pressure on coal, however, as the electricity market privatizes, and as electricity generation will no longer be a captive market for domestic coal. Imports of foreign coal already are on the rise, and electricity generators are looking more to natural gas.

The sector now employs only half the number of people as a decade ago. However, most of those employed are in the Asturias region, where the jobs are badly needed. It would be difficult to completely phase out coal mining because of this region's dependence on the industry for employment.

ELECTRICITY

Spain has the fifth largest electricity market in Europe (behind Germany, France, the United Kingdom, and Italy), and it is growing quickly. Electricity demand is estimated to have grown by 5.4% in 2001 to about 205 billion kilowatthours (bkwh). Red Electrica de España (REE), Spain's network operator, invested heavily in the network in 2001, with EUR 78.4 million invested in expanding the electricity network and REE announced plans in October 2001 to invest between EUR 60.2 million and EUR 72.2 million to improve the electricity connection with France. Spain's three largest electricity groups - Endesa, Iberdrola, and Union Fenosa - have announced massive investments planned from August 2001 to 2005 of EUR 34 billion, with much of that in Latin America and other European countries, but nevertheless including EUR 8 billion for new generating plants in Spain.



Endesa announced in July 2001, that it will build a natural-gas-fired, 400-megawatt (MW), combined-cycle generating turbine (CCGT) plant in Huelva by June 2004, in addition to three other gas-fired 400-MW CCGTs the company already has under construction in Spain near Cadiz, Barcelona, and Tarragona. Union Fenosa plans to add 5,000 MW of new capacity by 2005, mostly in Spain, of which 2,800 MW would be natural-gas-fired. Piemsa, an affiliate of Petronor, is planning to construct an 800-MW integrated gasification combined-cycle (IGCC) complex at a refinery near Bilbao that will make use of heavy refinery stocks. The plant will be one of the largest and most advanced of its kind in the world.

Spain's electricity market is privatizing ahead of the schedule mandated by the EU. A 1996 EU directive required that at least 26.48% of electricity sales in member countries be open to competition, beginning in February 1999. This requirement increased to about 28% in February 2000 and will grow to 33% in 2003.

Spain already has surpassed the 2003 requirement.

The Spanish electricity sector is in the midst of restructuring. There are five major utility companies in Spain, in descending order of size: the formerly state-held Endesa, Iberdrola, Union Fenosa, Hidrocantabrico, and the newly independent Viesgo. Viesgo's acquisition by Enel of Italy from Endesa was completed in January 2002, and Viesgo has a 5% market share. This is part of Enel's strategy of regaining market share abroad after selling its Elettrogen utility at home to Endesa in 2001.

Hidrocantabrico was sold in October 2001 to Electricite de France (EdF) and Eletricidade de Portugal (EdP), after the Spanish government decided to lift the veto on EdF's and EdP's voting rights. Some 60% of Hidrocantabrico will actually be owned by Energie Baden-Wurttemberg (EnBW) of Germany, which is controlled by EdF. The agreement is subject to commitments by the French and Portuguese governments to open up their electricity markets to Spain and subject to France increasing its interconnection with Spain from 1,000 MW to 4,000 MW between 2006 and 2011. This includes a new 1,200 MW line to run along side the planned high-speed rail line between Perpignan and Figueras in Catalonia.

In August 2001, Spain and Portugal signed an agreement to form a single electricity market by completely unifying their electricity networks. The unification is to be completed by sometime in 2003. There are still several unresolved obstacles to this. One obstacle is that there is minimal separation between transport and distribution activities, which remain monopolies, and production and marketing activities, which are open to competition. Another problem is that in Portugal production is sold to the state-held REN, which transports the electricity, whereas in Spain producers compete to sell electricity, but receive compensation payments for market liberalization called CTCs. The Spanish government in March 2001 reiterated its support for CTCs, but these payments are under investigation by the EU. The opposition PSOE party has called for their end. However, electricity companies have called for an end to tariff privileges enjoyed by several large industrial companies that they believe have made these companies uncompetitive internationally. In addition, electricity companies would like to raise their rates, arguing that prices have fallen 17% in the past five years, while inflation for the period has been 14%. In December 2001, a 1% rate increase was authorized for industrial customers. The Economy Ministry began investigating several electricity companies for alleged restrictive practices in order to raise prices in November 2001, though it has not revealed which companies are under investigation.

As electricity demand has increased rapidly in Spain in the past year combined with flat or low hydroelectric capacity, domestic supply has not been sufficient, and Spain began to import electricity from Morocco for the first time in December 2001 when cold temperatures created a surge in demand. Union Fenosa and Endesa have signed agreements with Moroccan power company ONE. Spain granted ONE the status of an "external operator" in 1998, giving the company the right to deal directly with Spanish electricity companies or on the Spanish spot market. The power exchange between ONE and Spanish companies is through the Spain-Morocco grid interconnection, which became operational in 1998. Two power connections between Algeria and Spain are also planned, one of which will run along side the Medgaz pipeline.

Spanish utilities are becoming increasingly involved in foreign power markets, especially in Latin America. Endesa owns a controlling stake in Chile's largest power provider, Union Fenosa is involved in Guatemala and Panama, and Hidrocantabrico has interests in Mexico. In neighboring France, Endesa acquired a 30% stake in SNET, which owns five coal-fired power plants, and hopes to control the company completely in a few years.

Nuclear Power

Spain is about 27% reliant on nuclear power for its electricity generation. Spain currently has nine nuclear reactors. In 2001 Spain's nuclear plants produced a record 63.6 bkwh, an increase of 2.3% compared to 2000. The Popular Party supports nuclear power, but the PSOE has indicated that it supports a gradual shut-down of Spain's nuclear plants. Currently, the construction of new nuclear plants is not illegal, but companies are unlikely to invest in such plants because of high costs and little government incentive.

COUNTRY OVERVIEW

Head of State: King Juan Carlos (since November 1975)
Prime Minister: Jose Maria **Aznar** (since May 1996)
Independence: 1492 (expulsion of the Moors and unification)
Capital City: Madrid
Population (July 2001E): 40 million
Location/Size: Southwestern Europe, bordering the Bay of Biscay, Mediterranean Sea, North Atlantic Ocean, and Pyrenees Mountains, southwest of France/504,750 sq km (slightly more than twice the size of Oregon)
Language: Castilian Spanish 74%, Catalan 17%, Galician 7%, Basque 2%
Religion: Roman Catholic 99%, other 1%

ECONOMIC OVERVIEW

Finance Minister: Cristobal Montoro
Currency: Euro (EUR)
Exchange Rate (1/29/2002): 1 US Dollar = 1.156 EUR Spanish Peseta
Gross Domestic Product (GDP, nominal, 2001E): $579 billion
Real GDP Growth Rate (2001E): 2.6% **(2002F):** 2.4%
Inflation Rate (consumer prices, 2001E): 3.7% **(2002F):** 2.4%
Unemployment Rate (2001E): 13.4% **(2002F):** 13.0%
Merchandise Exports (2000E): $115.1 billion
Merchandise Imports (2000E): $147.8 billion
Merchandise Trade Deficit (2000E): $32.7 billion
Major Trade Partners: France, Germany, Italy, United Kingdom, United States, Portugal
Major Export Products: Automobiles, tourism, power generation equipment, electrical machinery, petroleum and chemical products, foodstuffs
Major Import Products: Crude petroleum, vehicle and automobile parts, capital goods, and food

ENERGY OVERVIEW

Proven Oil Reserves (1/1/02E): 21 million barrels
Oil Production (2001E): 21,000 barrels per day (bbl/d), of which 7,000 bbl/d was crude oil
Oil Consumption (2001E): 1.48 million bbl/d
Net Oil Imports (2001E): 1.46 million bbl/d
Crude Oil Refining Capacity (1/1/02E): 1.3 million bbl/d
Natural Gas Reserves (1/1/02E): 18 billion cubic feet (Bcf)
Natural Gas Production (1999E): 5.1 Bcf
Natural Gas Consumption (1999E): 513.8 Bcf
Net Natural Gas Imports (1999E): 508.7 Bcf
Coal Reserves (12/31/96): 728 million short tons (Mmst)
Coal Production (1999E): 27 Mmst
Coal Consumption (1999E): 49 Mmst
Electric Generation Capacity (1999E): 44.9 million kilowatts
Electricity Generation (1999E): 197.7 billion kilowatthours (bkwh)
Electricity Consumption (1999E): 189.6 bkwh

ENVIRONMENTAL OVERVIEW

Minister of Environment: Jaume Matas
Total Energy Consumption (1999E): 5.2 quadrillion Btu* (1.4% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 81.5 million metric tons of carbon (1.3% of world carbon emissions)
Per Capita Energy Consumption (1999E): 132.6 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.1 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 8,707 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**

Carbon Intensity (1999E): 0.14 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (43.1%), Transportation (31.6%), Residential (15.0%), Commercial (10.3%)
Sectoral Share of Carbon Emissions (1998E): Industrial (39.3%), Transportation (38.9%), Residential (13.1%), Commercial (8.7%)
Fuel Share of Energy Consumption (1999E): Oil (57.0%), Coal (14.3%), Natural Gas (11.2%)
Fuel Share of Carbon Emissions (1999E): Oil (66.6%), Coal (23.1%), Natural Gas (10.3%)
Renewable Energy Consumption (1998E): 521.4 trillion Btu* (1% increase from 1997)
Number of People per Motor Vehicle (1998): 2.1 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 21st, 1993). Signatory to the Kyoto Protocol (signed April 29th, 1998 - not yet ratified).
Major Environmental Issues: Pollution of the Mediterranean Sea from raw sewage and effluents from the offshore production of oil and gas; water quality and quantity nationwide; air pollution; deforestation and desertification.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Desertification.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

Sources for this report include: CIA World Factbook; DRI/WEFA; Economist; Economist Intelligence Unit; European Union; Financial Times; Gas Natural; Petroleum Economist; Repsol; U.S. Energy Information Administration; World Markets Online.

Links

For more information from EIA on Spain, please see:
Spain Country Data

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September 2001

United Kingdom

With its significant North Sea reserves, the United Kingdom is a major European oil and natural gas producer. It is also one of the largest energy consumers in Europe.

Information contained in this report is the best available as of September 2001 and is subject to change.

BACKGROUND

The United Kingdom (official name: United Kingdom of Great Britain and Northern Ireland, abbreviated: UK) is a major political and economic world power and a close ally of the United States. It is also the world's fourth-largest economy. The country joined the European Union (EU) in 1973 (confirmed by referendum in 1975), but has no plans to join the common European currency, the euro, in the immediate future. Despite the UK's lack of participation in the euro, the country has continued to attract foreign direct investment (FDI) - about $517 billion total at the end of 2000, second in the world after the United States. The UK is an even larger exporter of capital - outward FDI at the end of 2000 totaled $902 billion, also second to the United States. The UK maintains a smaller public sector than many of its EU counterparts.

The UK, like most of the OECD, has seen growth rates decline in 2001. GDP growth in the UK is expected to decline to 2% in 2001, and will decline further still if the economy of the United States approaches a mild recession, as the UK economy is the second-closest linked to that of the United States of all the countries of the EU. This slowdown is also expected to decrease external demand, raising the trade deficit for 2001. Despite this, unemployment fell to a 26-year low in July 2001.

Given low inflation (under the government's target of 2.5% for 28 consecutive months) and the prospect of slackening growth (especially in the manufacturing sector), the Bank of England has cut interest rates four times in 2001, most recently in August.

The United Kingdom is by far the largest petroleum producer and exporter in the EU (Norway is not a member of the EU). It also is the largest producer and an important exporter of natural gas in the EU. Most of the UK's oil and gas reserves and production are located off the coast of Scotland, with the Scottish city of Aberdeen considered to be the oil and gas capital of the United Kingdom. The International Petroleum Exchange (IPE), the second-largest energy futures exchange in the world, is located in London. The second and third-largest publicly traded energy companies in the world in terms of market value, Royal Dutch/Shell and BP, respectively, are based in the UK (Royal Dutch/Shell is also based in the Netherlands). Because major UK energy companies are private, the imminent decline in British oil and gas production most likely will translate to an increase in UK companies' involvement abroad, mitigating the effect in the overall UK economy, though Scottish employment is particularly sensitive to North Sea production levels. The oil and gas industry represented about 12% of industrial capital investment, and 2% of total capital investment in 2000. The energy industry overall represents about 4% of GDP. The UK has high taxes on petroleum products, making for among the highest prices in the EU. High fuel prices caused protests and blockades in September 2000.

In July 1999, a Scottish Parliament met for the first time in almost 300 years. "Devolution" gives the Scottish Parliament the ability to tax its own citizens, plus jurisdiction over local issues such as education, health, transport, and agriculture. It has no effect on the economic and industrial structure of the United Kingdom, which remains a single market. Devolution has had no effect on North Sea oil and gas.

North Sea Oil and Gas

North Sea oil and gas reserves were first discovered in the 1960s. The North Sea did not emerge immediately as a key non-OPEC oil producing area, but North Sea production grew as major discoveries continued throughout the 1980s and into the 1990s. Although the region is a relatively high cost producer, its high quality crude oil, political stability, and proximity to major European consumer markets have allowed it to play a major role in world oil and gas markets.

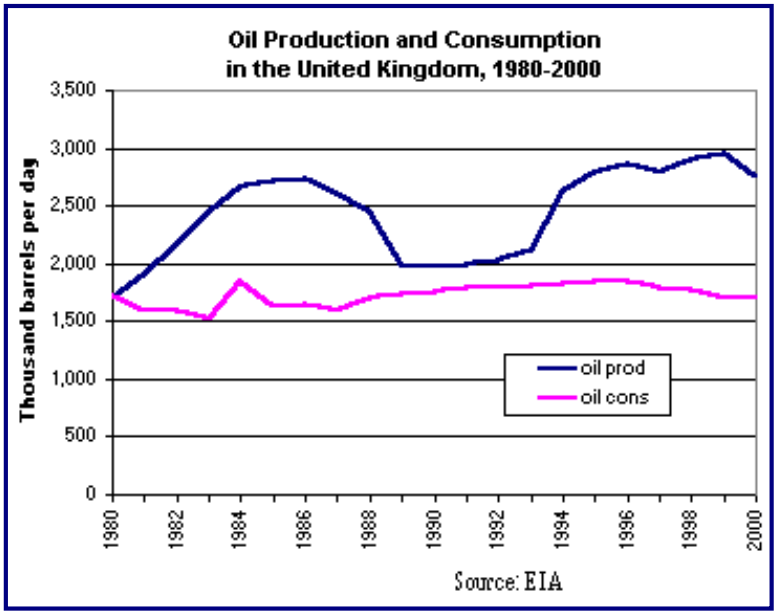
Many of the world's major crude oil prices are linked to the price of the North Sea's Brent crude oil. (Brent crude is a blend of North Sea crude oils and does not come exclusively from the Brent field.) Because Brent crude is traded on the International Petroleum Exchange in London, fluctuations in the market are reflected in the price of Brent. Therefore, all other crude oils linked to Brent can be priced according to the latest market conditions. Brent production is forecast to fall precipitously from its current 450,000 bbl/d by 2005, but discussions are reported to be underway on building a pipeline spur from the Statfjord system to the Shell-run Brent pipeline to Sullom Voe. The increased throughput would support trade in the increasingly dated Brent price marker, extending its life as a price marker and reducing volatility in the 15-day Brent forward market, where liquidity has fallen to about 10 cargoes per delivery month compared with 300-400 deals per month in the early 1990s.

The North Sea is considered a "mature" area, with few large discoveries likely to be made. Only a few frontier areas hold the possibility of further discoveries of large oil and gas fields. In both of the major North Sea producing nations, Norway and the UK, government and industry are taking steps to restructure their oil and gas sectors to make them more internationally competitive.

OIL

The UK holds about 5 billion barrels of proven oil reserves, almost all of which is located in the North Sea. Most of the country's production comes from basins east of Scotland in the central North Sea.

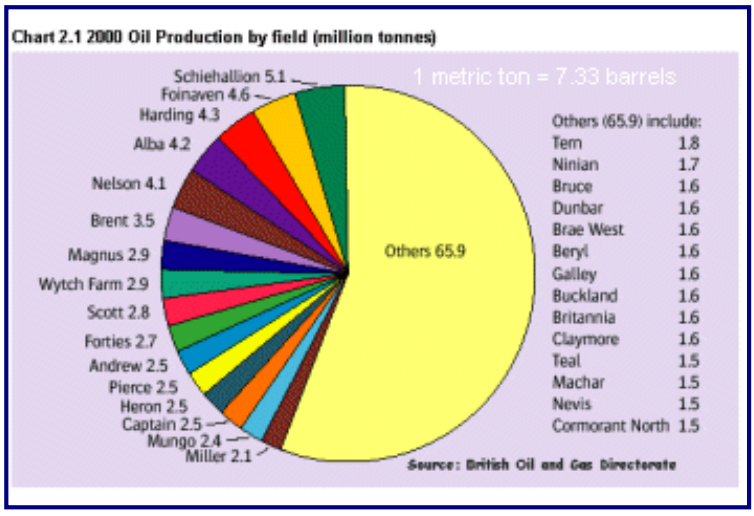
The northern North Sea (east of the Shetland Islands) also holds considerable reserves, and smaller deposits are located in the North Atlantic Ocean, west of the Shetland Islands. There are over 100 oil and gas fields currently onstream, and several hundred companies are active in the area. In 2000, the United Kingdom's production declined to 2.75 million barrels per day (bbl/d), down from a historical high of 2.95 million bbl/d in 1999. Production is expected to decline by 85,000 bbl/d in 2001. Most of the UK's crude oil production ranges in gravity from 30º to 40º API. Most high quality crude is exported, while cheaper, lower quality (mainly from the Middle East) crude oils are imported for refining. Unit costs for UK oilfields averaged just above $15 per barrel in 2000, though fields that started production in the 1990s have lower costs.



The domestic UK oil and gas industry is expected to decline as reserves are depleted in the coming decade. The British Oil and Gas Industry Task Force was set up in 1998 to bring together government departments and oil and gas industry representatives (the oil and gas industry is 100% in the hands of the private sector) to discuss the future of the industry. A successor body to the Task Force, known as "PILOT", now has been created to oversee the execution of Task Force recommendations and future developments. Government and industry are interested in collaborating to facilitate a "gentle decline" in British North Sea production, a component of which involves shifting focus from small numbers of very large projects to larger numbers of smaller projects.

Production

The number of fields under development or in production in the UK at the end of 2000 was 264. Just two fields ceased production, Bladen and Blenheim. Oil production from six offshore fields commenced in 2000: Bittern, Cook, Guillemot West, Guillemot North West, Shearwater (condensate), and Keith. In 2001, as of July, four new offshore oil fields were approved for development by the British Oil and Gas Directorate: Halley, Hannay, Kestrel, and Otter; and the Angus field was approved for redevelopment.



In December 2000, the British government gave approval to four new projects that will result in $1.5 billion in new investment in the British North Sea: (1) a £320 milliongas pipeline from the Shetland Islands to the Magnus oil field that takes suplus gas from Sullom Voe oil terminal on the Shetland Islands to be reinjected for enhanced recovery in the Magnus field; (2) a floating platform to drill for oil in the Leadon field which was discovered in 1979, but so far undeveloped, that is expected to yield 50,000 bbl/d of oil equivalent (see below); (3) further development by BP of

the Foinaven oil field; and (4) Ranger Oil's (subsidiary of Canadian Natural Resources Limited) production in the Kyle field, which started in April 2001 at 7,000 bbl/d, in addition to gas production. Total investment spending in the UK continental shelf in 2000 was about £3 billion, though continued high oil prices make it likely that investment will increase for 2001. Most new developments will be subsea, using existing infrastructure, instead of new platforms.

As noted above, production commenced in April 2000 from the Bittern, Guillermot West, and Guillermot North West fields by means of the Amerada-Hess operated Triton FPSO. About 78% of the content is British, and the three fields have reserves of about 140 million barrels of oil and 180 billion cubic feet (Bcf) of gas. Expected field life is 13 years and daily production is 60,000 bbl/d. Another development is the £350-million expansion Area B to Texaco's Captain field completed in December 2000 allows production to increase by 25,000 bbl/d to 85,000 bbl/d and will extend the field's life to beyond 2015.

Some of the smaller projects planned for the British North Sea include development of the Jade and Blake fields. In January 2000, the British subsidiary of Phillips Petroleum (operator) and its partners British Gas, Texaco, Agip, and OMV received approval from DTI to develop the Jade field. The field is expected to produce 15,000 bbl/d of crude oil and 200 million cubic feet per day (Mmcf/d) of natural gas after it comes onstream in late 2001. The BG-operated Blake field represents the opening up of the Outer Moray Firth for new discoveries and developments. It has a subsea tie-back to the existing Bleo Holm FPSO, and will extend the life of the existing Ross field. Production is expected to start in third-quarter 2001.

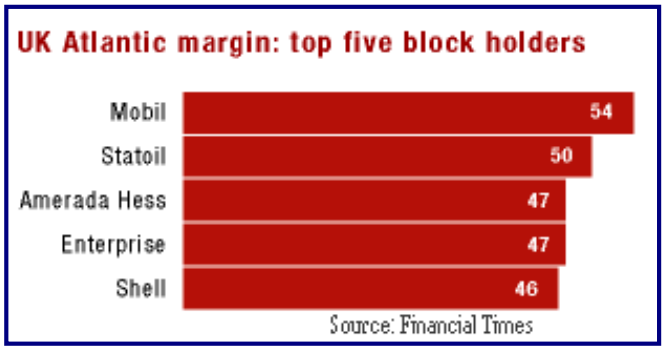
Another important development is the Skene field, which is being developed by operator ExxonMobil as a subsea tie-back to the Beryl Alpha platform. This field has a complex mix of hydrocarbons, including crude oil and condensate, that is estimated to be about 100 million barrels of oil equivalent. Only the implementation of the latest technology using a heated flowline bundle has made recovery possible. It is expected to come online in April 2002.

A larger project that was given approval in 2000 is the development of the Leadon field. It was discovered in 1979, but became economically viable with the discovery of a northern extension of the field. The Canadian company Kerr-McGee-operated field is expected to commence production in early 2002, and will peak at 40,000 bbl/d of crude oil.

Europe's largest on-shore oilfield is Wytch Farm. Estimated reserves are 500 million barrels. Egdon Exploration is active in the area, and it is hoped that even smaller fields can be economically viable as they are on-shore. Other smaller on-shore fields are clustered in east-central England.

Industry Structure

Industry reorganization that started with BP's 1998 merger with Amoco continues. The merged BP Amoco, (now simply BP) already one of the world's largest petroleum companies, announced in April 1999 its intentions to take over Los Angeles-based Atlantic Richfield (Arco), which was completed in April 2000. The merged company is truly global and is the world's third-largest publicly traded oil and gas company. Most of the majors have a share of UK North Sea production, including BP, Chevron, Conoco, ENI, ExxonMobil, Royal Dutch/Shell, Texaco, and TotalFinaElf. Amerada Hess, Enterprise, and Statoil also have large shares. The graphic shows the number of blocks held by each top-ranking company in 2000.



BP Exploration is managed from Aberdeen, Scotland (as are most other companies that are active in the British North Sea). BP produces oil and gas and brings ashore 40% of the UK's total production through the Forties Pipeline System to Grangemouth, Scotland. BP Amoco has producing fields in the North Sea and, since the end of 1997, in the North Atlantic, west of the Shetland Islands. It operates the Sullom Voe oil terminal in the Shetlands, which is Europe's largest oil terminal. The 206,000-bbl/d oil refinery and petrochemical complex at Grangemouth represents one of Scotland's largest industrial complexes.

British independent oil companies, important in the North Sea oil scene, were particularly hard hit by the oil price collapse of 1998. As a result, the major five independents at the time, Enterprise, Lasmo, Premier, British-Borneo, and Cairn, were hesitant to approve new investment and development in 1999-2000, though Enterprise has now begun more investment and development. The consolidation sweeping the oil majors has affected the independents. Enterprise, the largest British independent, unsuccessfully attempted to take over the second largest, Lasmo, in the spring of 1999. Enterprise's UK production was 164,907 barrels of oil equivalent per day in 2000. In 2000, Italian oil and gas giant ENI began to acquire British independents, British-Borneo in March 2000, and Lasmo in February 2001. This gives ENI a presence in the North Sea, and increases its worldwide oil and gas assets, particularly in Asia. Regarding the remaining two independents, Premier is heavily focused outside of the UK, and Cairn's production and reserves are very small, even for an independent.

Downstream

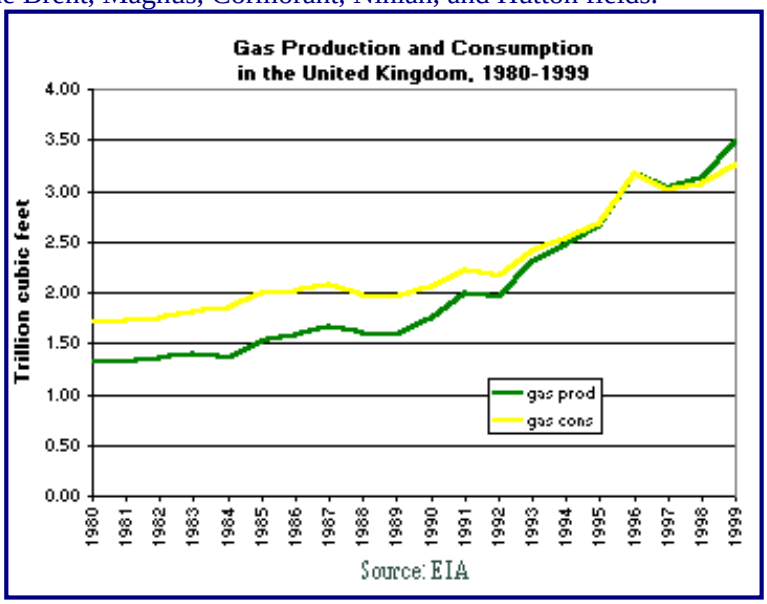
The UK's crude oil refining capacity is approximately 1.77 million barrels per day, just slightly more than the country's consumption. However, the UK imports and exports refined products because British refineries produce an excess of some grades and products and insufficient quantities of others for local demand. Additionally, demand for gasoline varies seasonally. The largest refinery is ExxonMobil's (Esso's) 311,240-bbl/d Fawley refinery in Southhampton, one of the largest in Europe and marine tanker accessible. It also has a pipeline to the on-shore Wytch Farm field. The 100,000-bbl/d Port Clarence Phillips-Imperial Petroleum refinery at North Tees is connected by pipeline to the Phillips Consortium Ekofisk Oil Terminal at Seal Sands, giving it a direct feed from the North Sea. The Grangemouth refinery is also directly connected to the North Sea through the Forties Pipeline System.

Petroleum products represented 45% of final energy consumption in 2000. The retail gasoline market is dominated by Esso (ExxonMobil), BP, Shell, TotalFinaElf, Texaco, and Conoco, which together account for 58% of gasoline sales. Supermarkets now account for 8% of retail sales. Total retail sales were 28 billion liters (7.4 billion gallons) in 2000. The transport sector consumed 74% of petroleum products in 2000, whereas the energy industry consumed just 7%. Fuel oil use has declined 30% since 1998, as industrial and home-heating demand has dropped in favor of gas.

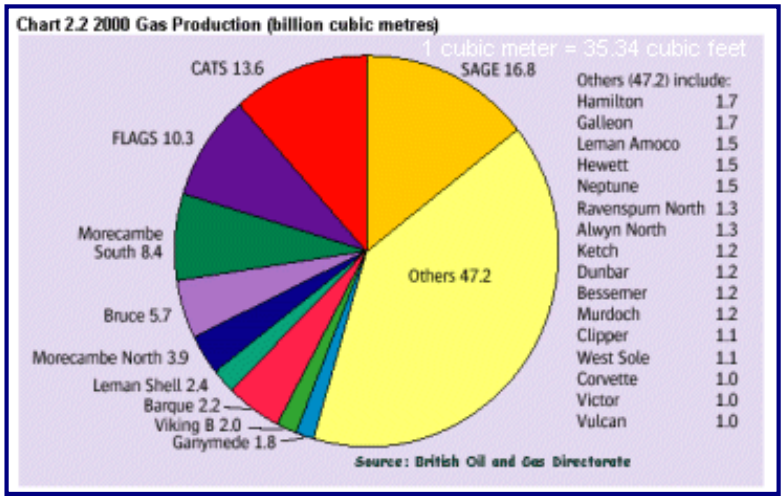
NATURAL GAS

The UK contains an estimated 26.8 trillion cubic feet (Tcf) of natural gas reserves, most of which are in non-associated gas fields located off the English coast in the Southern Gas Basin, adjacent to the Dutch North Sea sector. The UK shares the declining Frigg field with Norway (39.18% to the UK), which is expected to be shut down in 2002, and has small share of the 0.44-Tcf Statfjord field (14.53%). There are a few small fields on-shore. The Irish Sea contains the large Morecambe and Hamilton fields. Morecambe alone accounts for up to 20% of British natural gas production. Key producing gas fields in the North Sea include BP's 5.7-Tcf Leman, Chevron and Conoco's 3-Tcf Brittania, Shell's 1.7-Tcf Indefatigable and 0.8-Tcf Clipper, and TotalFinaElf's 0.85 Tcf Elgin. Key pipelines are the Scottish Area Gas Evacuation (SAGE) system to the St Fergus Terminal, which

handles gas produced from a number of North Sea fields, including Britannia, the Beryl and Brae areas, and others in the central/northern North Sea, the Central Area Transmission System (CATS) that also goes to the Central North Sea, and takes gas from several fields, including Everest, Judy, and Jade, and others, and the Far North Liquids and Associated Gas System (FLAGS) that takes gas from the northern North Sea, including the Brent, Magnus, Cormorant, Ninian, and Hutton fields.



The largest project to come online in 2001 (in March) in the British North Sea is the TotalFinaElf-operated Elgin/Franklin platform, which might prove to be the last big North Sea production platform. It is the world's largest high-pressure, high temperature development. The Elgin/Franklin platform has extensive processing facilities, unlike most North Sea platforms. The $2.3-billion platform is expected to last for 22 years in its location in the central North Sea, in the Graben area, off the coast of Scotland. It is to produce 700 million barrels of oil equivalent, about half condensate and half natural gas. This equates to peak production of 350 million cubic feet per day (Mmcf/d) of natural gas. The export pipelines are shared with the Shearwater field, and include a 294-mile gas pipeline to Bacton and a 24-mile condensate pipeline to the Marnock platform. The Shell-operated Shearwater field in the central North Sea was inaugurated in September 2000, and has reserves of 0.71 Tcf natural gas and 110 million barrels of condensate. Gas production is expected to peak at 375 Mmcf/d.



The Brigantine cluster is the most important recent development in the Southern Gas Basin. It is three fields with two platforms using extended reach horizontal wells to get at reserves of 0.27 Tcf. Shell is the operator, and production of 130 Mmcf/d commenced in the first quarter of 2001. There is a 12-mile pipeline to the Corvette platform, which is connected indirectly with Bacton.

British Gas was the monopoly supplier to the interruptible market until the passage of the 1995 Gas Act, which split the company into supply and shipping (British Gas Trading Limited) and while other functions remained with British Gas, including transport subsidiary Transco. In 1997, Centrica was demerged from from British Gas, and British Gas was renamed BG. Centrica is the holding company for British Gas Trading, British Gas Services, the Retail Energy Centers, and is the producer in the Morecambe fields. BG retained Transco, along with exploration and production, international downstream, R&D and properties. In October 2000, BG again split, with Transco becoming part of a separate holding company Lattice Group. Independent Gas suppliers entered the firm (non-tariff) market in 1990, but the larger interruptible market (smaller customers) brought in competition in 1995. The consumer gas market was deregulated by region from October 1997 to June 1998, such that all residential and commercial customers could choose their supplier at the end of this process. At the end of 2000, suppliers other than British Gas Trading had captured 20-30% of the market in many

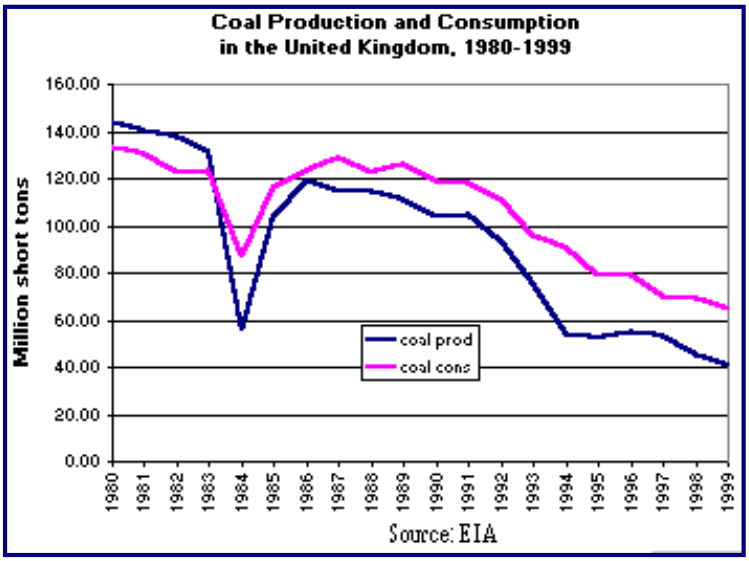
regions of the UK. In July 2001, Houston-based Dynegy purchased BG Storage from what remains of BG for $590 million, acquiring gas production wells and platforms, salt caverns, pipelines, and a natural gas processing terminal.

The UK's gas and electricity regulatory body is the Office of Gas and Electricity Markets (Ofgem). Ofgem has proposed reforming price controls on Transco's pipeline usage fees. The privatization of the UK's gas industry, leading to an increased gas supply and reduced prices, has helped gas to replace much of the UK's reliance on coal as a source for electricity generation. The natural gas share of utility fuels was 1% in 1988 and is expected to increase to almost 50% by 2010. Privatization in the UK has progressed well in advance of EU requirements.

In 1998, the UK-Continent Gas Interconnector pipeline was opened, with terminals at Bacton, England and Zeebrugge, Belgium. This is the first natural gas pipeline linking the United Kingdom to the European continent. A new pipeline to connect Ireland to Scottish gas sources in the Corrib field was approved in November 1999, and a plan to connect Ireland to England via Wales was announced in April 2000. A pipeline would run from Manchester, England, underground to Wales, and then under the Irish Sea to just north of Dublin. There is currently one pipeline linking Britain and Ireland, connecting Ireland to Scottish gas sources. Despite these pipeline projects, the UK will remain a much smaller natural gas exporter than North Sea neighbor Norway, and will eventually become a net importer as the UK begins to import Norwegian gas again. Norway had once supplied up to a quarter of British demand in the 1980s, but this dwindled as the Frigg field that supplied the gas was depleted. The new Vesterled gas pipeline, set to begin operations October 1, 2001, will be one of the ways Norwegian gas may enter the UK. Vesterled will connect the existing Frigg pipeline with the Heimdale platform, which is already connected by pipeline to the Sleipner gasfields, and from there to other areas of the Norwegian North Sea such as the Ormen Lange gasfield that is scheduled to come on stream in 2006. In July 2001, BP announced a 15-year contract to buy 56.5 billion cubic feet (Bcf) natural gas per year from Statoil. However, Statoil has indicated that it would not import large volumes of gas through Vesterled unless Britain changed its pricing system for bringing gas onshore from North Sea fields. Statoil officials have asserted that the UK's system of auctioning entry capacity, or access rights to the national pipeline system, had produced volatile, very high prices.

COAL

Coal production and consumption in the United Kingdom have decreased dramatically since 1986. UK coal production fell from 119 million short tons (Mmst) in 1986 to 40.9 Mmst in 1999. Production fell again in 2000, but demand rose, increasing imports. In 2000, steam coal accounted for 80% of coal demand, coking coal for 15%, and anthracite for 5%. Electricity demand accounted for 95% of demand for steam coal and 46.5% of demand for anthracite. In the late 1980s, coal accounted for about two-thirds of the United Kingdom's thermal electricity production. Currently, less than half of UK thermal electricity is coal-fired, and the figure is expected to fall below one-third by the end of the decade. Coal mines are located primarily in central and northern England and southern Wales, with some coal mines also found in southern Scotland. The UK produced 40.5 million tons of bituminous coal and 409 thousand tons of anthracite coal in 1999. The UK also produces coke-oven coke in quantities such that it is self-sufficient. Nevertheless, net imports of coal in 1999 were 23.9 million tons.



Between 1984 and 1985, the British coal miners' union staged a year-long strike. The strike dramatically altered energy production and consumption patterns in the United Kingdom for that year and precipitated the longer term decline of the industry (see graph). Employment in the industry has plummeted since the late 1980s. The United Kingdom began liberalizing its electricity market in 1989, and this liberalization is one of the major reasons for the decline of the country's coal industry. Prior to the privatization of electricity, the cost of domestic coal to electric utilities had far exceeded the cost of coal traded in international markets. The Central Electricity Generation Board (CEGB) had been the primary purchaser of British coal. The CEGB largely subsidized the British coal industry, purchasing domestic coal at above world market prices and then passing on those costs to consumers. This ended when National Power and PowerGen, two private electricity generation companies, were formed in the early 1990s, weakening the bargaining power of British Coal, the national coal company.

In 1992, the British coal industry reached a turning point. Growing competition from increasingly available natural gas, the imminent removal of the regional electricity companies' captive franchise supply markets, and newly-enacted pollution abatement goals all worked to initiate the steady decline of the industry. The industry was privatized in 1994, at which point RJB Mining bought the major British Coal assets and become the country's major producer. Mining Scotland and Celtic Energy are the other two remaining companies. The UK coal industry had not received any subsidies since 1995, but in November 2000 the European Commission approved a modernization plan and aid scheme. The aid would go toward mines/production units that have long-term economic viability on the world market, but are having temporary difficulties as they restructure in an effort to reduce production costs. The total amount of aid will not exceed £110 million, and two disbursements of £25 million and £21 million have been made so far. Production costs over the period 1992 to 1999 already fell 35%, and the expectation is that these costs can fall further still before the aid scheme expires in July 2002.

New EU environmental directives are expected to further increase British coal production costs, leading some analysts to predict an end to the United Kingdom's coal industry in the early 2000s. RJB Mining is more optimistic about the future of British coal. RJB maintains that foreign coal prices will increase, making British coal more competitive, and that clean coal technology will allow power stations to burn increased amounts of coal without increased greenhouse gas emissions. Higher natural gas prices, gas-fired power plant outages for maintenance and repair, and reduced nuclear power led to a 14% increase in coal consumption by power producers in 2000.

ELECTRICITY

The United Kingdom has 70 million kilowatts of installed electric capacity, about 80% of which is thermal, 18% nuclear, and 2% hydropower. The country generated 342.8 billion kilowatt hours (bkwh) of electricity in 1999, making it the third-largest electricity market in Europe (behind Germany and France).

Electricity privatization began in the early 1990s, and the final phase of transition ended in May 1999. Initially, all non-nuclear state-owned power stations were privatized and four major generating companies -- PowerGen and National Power in England and Wales, and ScottishPower and Hydro-Electric in Scotland -- were formed to operate the stations. The grid distribution system in England and Wales became the property of the National Grid Company. Regional Electricity Boards were

privatized as separate distribution companies. Large customers were the first to be able to choose their suppliers, with all small customers (below 100 kW peak load) being able to choose by May 1999.

The number of electric generation companies in the United Kingdom has increased to 27 as a result of the liberalization process, according to DTI, such that 40% of the UK's electricity was generated by these new companies in 2000. In March 2001, the structure of the electricity industry changed yet again. Under the former system, generators and suppliers in England and Wales traded electricity through the electricity pool, which was regulated by the National Grid Company, owner of the transmission network. The New Electricity Trading Arrangements (NETA) changed this to a system based on bilateral trading between generators, suppliers, traders, and customers. The system includes fowards and futures markets, a balancing mechanism to enable the National Grid Company to balance the system, and a settlement process. Dallas-based TXU purchased United Utilities' retail electricity and natural gas business, Norweb Energi, for $465 million in August 2000. This, added to TXU's European retail business Eastern Energy, creates the UK's largest electricity retailer, with over 5.6 million customers. Powergen, with 2.6 million retail customers as well as 14% of electricity generation in England and Wales, merged with Louisville-based LG&E Energy in December 2000.

In Scotland, the two main companies, Scottish Power and Scottish and Southern Energy, cover the full range of electricity provision. Ofgem has made proposals to further reform the Scottish power market. Northern Ireland, part of the United Kingdom but not part of Great Britain, is served by Northern Ireland Electricity, one of the largest companies in Northern Ireland and part of the Viridian Group. Northern Ireland has a separate electricity and gas regulatory body, Ofreg. The grids of Northern Ireland and the Republic of Ireland are connected for electricity import/export.

Nuclear

In 1995, the government announced that it would privatize its more modern nuclear stations while retaining ownership of older stations. In 1996, more modern stations were privatized and British Energy became the holding company of Nuclear Electric and Scottish Nuclear, which merged in 1998 to form British Energy Generation, the nation's largest private nuclear generator and the world's first wholly privatized nuclear utility. British Energy operates eight nuclear power stations in the UK (as well as several in the U.S. through its AmerGen subsidiary that is jointly owned with PECO). Each station consists of two advanced gas-cooled reactors, except Sizewell B, which is a modern pressurized-water reactor. Nuclear power stations were not privatized simultaneously with non-nuclear stations. No new plants have been built since 1995, but because of limited domestic coal and gas reserves in the long run, new construction is under discussion, at least to maintain nuclear's market share as older nuclear plants are retired. Of the UK's 33 reactors, 26 are of the old Magnox design. Six of the Magnox reactors are being decommissioned, as well as the Dounreay prototype fast reactor. The remaining Magnox plants are run by the state-owned British Nuclear Fuels. British Nuclear Fuels operates the Sellafield reprocessing plant, and is one of only two companies in the world that provides reprocessing and recycling technologies. The British nuclear industry is regulated by the Department of Trade and Industry's Nuclear Directorate.

ENVIRONMENT

With a reduction in sulfur dioxide and carbon dioxide emissions, environmental conditions in the United Kingdom have improved over the past couple of decades. Some of these environmental improvements, such as a reduction in air pollution, can be attributed to the United Kingdom's energy use choices. Partially as a result of deregulation and the elimination of coal subsidies, coal's share of total primary energy consumption is gradually being replaced by natural gas.

Improvements in energy efficiency have led to a gradual reduction in both energy and carbon intensity. In 1980, energy intensity in the United Kingdom registered 11.70 thousand Btu per $1990, decreasing to 8.37 thousand Btu per $1990 in 1999, a 27% decline. Similarly, carbon intensity in 1999 registered 0.13 metric tons of carbon per thousand $1990, a 45% decrease from 1980 levels. Per capita energy consumption, at 167.8 million Btu in 1999, is rising gradually.

As the United Kingdom enters the 21st century, many energy and environment-related policies reflect the country's awareness of climate change issues. With introduction of the Climate Change Levy in 2001, and its exemption for renewable energy resources like solar and wind, these alternative sources of energy are beginning to gain more attention. For example, the United Kingdom hopes to increase the share of electricity generated by renewables from the current 2%, to 10% by 2010.

Sources for this report include: Aberdeen Press & Journal; CIA World Factbook; Economist; Economist Intelligence Unit ViewsWire; Financial Times; Hart's European Offshore Petroleum Newsletter; Oil & Gas Journal; Petroleum Economist; Petroleum Intelligence Weekly; The Scotsman; U.K. Department of Trade and Industry; U.S. Energy Information Administration; WEFA World Economic Outlook.

COUNTRY OVERVIEW

Head of State: Queen Elizabeth II
Prime Minister: Anthony (Tony) Blair, re-elected June 2001
Population (2000E): 59.5 million
Location/Size: Western Europe, islands including the northern one-sixth of the island of Ireland between the North Atlantic Ocean and the North Sea, northwest of France/244,820 sq km (slightly smaller than Oregon)
Capital City: London
Language: English
Ethnic groups: English 81.5%, Scottish 9.6%, Irish 2.4%, Welsh 1.9%, Ulster 1.8%, West Indian, Indian, Pakistani, and other 2.8%
Religions: Anglican 27 million, Roman Catholic 9 million, Muslim 1 million, Presbyterian 800,000, Methodist 760,000, Sikh 400,000, Hindu 350,000, Jewish 300,000 (1991 est.)
Defense (8/98): Army, 113,900; Navy, 44,500; Air Force, 52,540

ECONOMIC OVERVIEW

Chancellor of the Exchequer: Gordon Brown
Currency: Pound sterling
Exchange Rate (9/04/01): 1 US Dollar = 0.69 pounds
Gross Domestic Product (GDP, 2000E): $1,415 billion
Real GDP Growth Rate (2000E): 3.0% **(2001F):** 2.0%
Inflation Rate (consumer prices, 2000E): 2.9% **(2001F):** 2.0%
Unemployment Rate (2000E): 3.7% **(2001F):** 3.4%
Merchandise Exports (2000E): $283 billion
Merchandise Imports (1999E): $327 billion
Major Trading Partners: United States, Germany, France, Netherlands
Major Exports: Food, beverages, and tobacco; crude materials, fuels, chemicals, machinery, transport equipment
Major Imports: Food, beverages, and tobacco; crude materials, fuels, chemicals, machinery, transport equipment

ENERGY PROFILE

Secretary of State for Trade and Industry: Patricia Hewitt
Minister of State for Industry and Energy: Brian Wilson
Proven Oil Reserves (1/1/01): 5 billion barrels
Oil Production (2000): 2.75 million bbl/d, of which 2.48 million bbl/d was crude oil
Oil Consumption (2000): 1.7 million bbl/d
Crude Oil Refining Capacity (1/1/01): 1.77 million bbl/d
Net Oil Exports (2000): 1.05 million bbl/d
Natural Gas Reserves (1/1/01): 26.8 trillion cubic feet (Tcf)
Natural Gas Production (1999E): 3.49 Tcf

Natural Gas Consumption (1999E):3.26 Tcf
Natural Gas Net Exports (1999E): 0.02 Tcf
Major Systems: Brent, Ninian, Forties, Flotta, Fulmar
Major Fields: E. Brae, Brent, Forties, Magnus, Miller, Scott
Oil and Gas Companies: Amerada Hess, BP Amoco, BHP, Chevron, ExxonMobil, Kerr-McGee, Phillips, Ranger Oil, Shell, Texaco
Recoverable Coal Reserves (12/31/96E): 1.65 billion short tons
Coal Production (1999E): 40.9 million short tons (Mmst)
Coal Consumption (1999E): 64.8 Mmst
Electrical Generation Capacity (1/1/99): 69.9 gigawatts (79.7% thermal, 2.1% hydro, 18% nuclear, 0.2% other)
Electricity Generation (1999E): 342.8 billion kilowatt hours (bkwh)
Electricity Consumption (1999E): 333 bkwh

ENVIRONMENTAL OVERVIEW

Secretary of State for the Environment, Food, and Rural Affairs: Margaret Beckett
Total Energy Consumption (1999E): 9.9 quadrillion Btu* (2.6% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 152.4 million metric tons of carbon (2.5% of world carbon emissions)
Per Capita Energy Consumption (1999E): 167.8 million Btu (vs. U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.6 metric tons of carbon (vs. U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 8,365 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**
Carbon Intensity (1999E): 0.13 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (37.0%), Residential (25.4%), Transportation (26.1%), Commercial (11.5%)
Sectoral Share of Carbon Emissions (1998E): Industrial (33.7%), Transportation (31.3%), Residential (24.3%), Commercial (10.6%),
Fuel Share of Energy Consumption (1999E): Oil (35.0%), Natural Gas (34.9%), Coal (15.7%)
Fuel Share of Carbon Emissions (1999E): Oil (41.2%), Natural Gas (33.4%), Coal (25.5%)
Renewable Energy Consumption (1998E): 137 trillion Btu* (15% increase from 1997)
Number of People per Motor Vehicle (1998): 2.3 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change. Under the negotiated Kyoto Protocol (signed on April 29th, 1998 - not yet ratified), the UK has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: Sulfur dioxide emissions from power plants contribute to air pollution; some rivers polluted by agricultural wastes and coastal waters polluted because of large-scale disposal of sewage at sea.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP based on EIA International Energy Annual 1999.

Links

For more EIA information on the United Kingdom:
EIA - Country Information on the United Kingdom
Electricity Restructuring and Privatization in the United Kingdom

Links to other U.S. Government sites:
CIA World Factbook - United Kingdom
U.S. State Department Country Commercial Guides: Europe
U.S. State Department Consular Information Sheet
U.S. Geological Survey, map of the United Kingdom including oil fields

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British Petroleum
Royal Dutch/Shell
Energy Links for the UK from Online Energy Services
International Petroleum Exchange
Grampian Oil and Gas Directory (an online database of companies operating in Scotland)
Scottish Enterprise Energy Group
RJB Mining
Electricity Association
National Power
PowerGen
ScottishPower
National Grid
Northern Ireland Electricity
British Energy (nuclear generator)
British Nuclear Fuels
UK Energy Centre
Ofgem
Ofreg
Department of Trade and Industry
Department of Environment, Transport and the Regions
British Embassy in Washington, D.C.
Scottish Parliament
International Energy Agency United Kingdom 1998 Review
Royal Institute of International Affairs, Energy and Environmental Programme
European Commission Directorate General XVII (Energy)

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